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PROCEEDINGS OF THE FIFTH ANNUAL MEETING OF
THE WESTERN PSYCHOLOGICAL ASSOCIATION,
UNIVERSITY OF CALIFORNIA, BERKELEY, JULY 24
AND 25, 1925.

W. R. MILES, *Stanford University, California, Secretary.*

The four regular sessions were held this year in the Psychology Building on the Berkeley Campus. Professor E. C. Tolman had charge of local arrangements. Twenty papers were presented. The attendance was representative, the registration of professional psychologists numbering, as is usual, about sixty. The meetings were open to the public. The presence of Professor Wolfgang Köhler of Berlin added much interest to the discussions, which were noteworthy.

Following the dinner on the evening of July 24th, Dr. A. H. Sutherland, President of the Association, presented "Some Experiences as an Applied Psychologist." The group then adjourned to the Wheeler Auditorium where to an audience of about 1,400 Professor Köhler described his experiments with apes and showed his remarkable motion pictures of the apes "at work." On Saturday, July 25th, the psychologists at Mills College gave a luncheon to the women of the Association.

The officers elected for the year 1925-26 are the following: President, Professor Walter Miles, Stanford University; Vice-President, Professor Kate Gordon, University of California, Southern Branch, Los Angeles; Secretary-Treasurer, Professor Warner Brown, University of California, Berkeley.

ABSTRACTS OF PAPERS

Ideomotor Action and Dynamogenesis. HERBERT S. LANGFELD, Princeton University, Princeton.

Modern textbook making presents a number of features which, aside from the contents of the book, are of psychological interest. Reference is made especially to two tendencies. One of these is the altering of old concepts, probably unconsciously, to suit the author's own view. The other is to follow tradition and to pass on without question results which have originally been presented by recognized authorities and which have been strengthened not by substantiation through experimentation but by repeated quotation.

The changes in the concept of ideomotor action and dynamogenesis are given as examples of the first tendency. It is shown how the definition of dynamogenesis, which is most widely accepted to-day, differs essentially from the view held by Féré and James. The concept of mental dynamogeny as formulated by Baldwin and Ladd connect dynamogeny with ideomotor action and frequent confusion results from this link between the two concepts. It is further shown that James has been misquoted by several writers who have attacked his theory of ideomotor action. It is also pointed out that in several cases incorrect examples are used to illustrate such action.

The object of the paper is not to defend or criticize either theory, but to show the changes they have undergone and the misconceptions which have arisen, and more generally to emphasize the danger arising in the annual increase in psychological textbooks.

Post-Rotational Head Nystagmus in Adult Pigeons. FRANKLIN FEARING, Stanford University.

One hundred and one adult pigeons, ranging in age from two months to two years, were each given a series of ten rotations, five in clockwise and five in counterclockwise direction, the directions being alternated. Each rotation consisted of ten turns in twenty seconds, on a rotating table the starting and stopping of which was automatically controlled so that acceleration and retardation were constant. The experimental session with each bird lasted about twenty-five minutes. Vision was excluded by placing a chamois skin cap on the bird's head. Of the birds, 52 began on a clockwise rotation and 49 of them began on the counterclockwise rotation. Records for each of the ten successive rotations were taken, consist-

ing of (1) the number of head movements making up the after-nystagmus and (2) the duration of the after-nystagmus in seconds.

The average number of head movements for the initial post-rotational nystagmus was 30.05, with an average initial time of 21.7 seconds. The average final after-nystagmus was 21.05, with an average time of 16.4 seconds, a reduction of 30 per cent in the number of head movements, and 24 per cent in time. This reduction is the more striking since it took place in about twenty-five minutes.

There was relatively little transfer of this practice effect from one direction of rotation to the other.

When the initial rotation was in the clockwise direction longer duration of nystagmus and greater number of head movements resulted. Group differences in age and weight seemed the most probable explanation of this, although the final explanation awaits further experimental analysis. Non-significant coefficients of correlation were found between age or weight of bird and nystagmus, with the exception, that between age and nystagmus one group gave a negative coefficient of $-.20 (\pm .09)$. A coefficient of $.82 (\pm .02)$ was found between number of head movements and time duration of head movements.

Weber's Law in the Discrimination of Maze Distance by the White Rat. JOSEPH G. YOSHIOKA, University of California, Berkeley.

De Camp proved that the rat could learn to discriminate distance in a simple maze. The just noticeable difference (J.N.D.) was found to be 12/100. De Camp did not test whether this J.N.D. would remain the same for changes in the total absolute distance, i.e., whether or not Weber's law would hold. The present experiment attempts a verification of this.

The problem was attacked by the method of average error. This method offers the following advantages: (1) The practice in training and testing can be made constant without involving the criteria of learning. (2) Weber's law can be proved without ascertaining of the so-called "threshold." Maze I was constructed so that the double alleys issued side by side in the same direction from a common food box. The rat in the maze makes a round trip from the food box back to the food box through one of the double alleys. One of the double alleys remains constant at 298 inches while the other can be shortened at will by intervals of thirteen inches. Five pairs of such short alleys were used, five on one side, five on the other. The

ratio to the constant long alley was 1.05, 1.09, 1.15, 1.21, 1.28. The short alleys are named R_5, R_4, R_3, R_2, R_1 , for the right side, and L_5, L_4, L_3, L_2, L_1 , for the left side. The pair of the same subscript have the same length. The record of each pair is treated under scores D_5, D_4, D_3, D_2, D_1 . The combination of R and L scores under D would cancel out any preferential tendency of the rat choosing the right or left side.

The experimental procedure was as follows: The first rat was given the choice of two paths, the constant long path and a short path, say R_1 . The second was to choose between the constant and another short path, say L_5 . Each rat chose only one of the short paths. At the end of each round trip through either of the long or short paths the reward was given. Six trials per day for nine successive days was the daily schedule. The record was taken of the correct and incorrect choice of paths and of confused running. The data in the first four days (in which confused running was common) were discarded. A correct choice of the short path by straight forward running during the last five days was credited as one score for the rat. Thus each rat had thirty chances to choose. Ninety-seven rats, distributed equally to the choice of five pair of distances, ran through maze I. The scores of the correct choices of the short path for each rat were plotted on the Y-axis against the differences of the short paths from the constant long path, on the X-axis. The correlation coefficient by Pearson's product-moment formula between these scores and the difference of distance was found to be $+.395 \pm .057$.

Maze II was constructed in exactly the same pattern as maze I but the whole dimension was magnified twice. The constant long path was 596 inches and the five pairs of short paths decreased in length by steps of 26 inches. One hundred rats were run in maze II exactly as before. The correlation coefficient between the scores of the correct choices and the difference of distance was $+.398 \pm .057$. When two regression lines of these two correlation surfaces are plotted on the same surface the P.E. limits of the first lies within the P.E. limits of the second. This result means nothing else than that the same relative difference yields the same proportion of correct choices with different absolute distances. And this formulation is nothing else than Weber's law. Hence it may be concluded that Weber's law holds in the discrimination of distance by the white rat in a maze within the limit of distance experimented with. Defining the threshold as an interval or distance where the rate of increase

of the correct choice is maximum, it was found to be 12/100, thus confirming the J.N.D. found by De Camp.

On the Reaction Time of the Eye. W. R. MILES, Stanford University.

When an object appears suddenly in the visual field the eyes usually turn toward it. The reaction time—duration from the moment of appearance until the eyes just start to move—is not a constant value. The usual range found for young men is from .167 to .415 sec. The event seems more like a discriminative reaction than like a reflex. The average value for any man depends much on practice and on the relative complexity of the visual field and measurement conditions. If the average time on the first day is .250 sec., it may have reached a level of .170 sec. by the tenth. No striking difference is found for results under monocular and binocular conditions. The reaction time was not uniformly modified by the distance between the preliminary fixation point and the stimulus or by the eight axes in which stimuli were presented.

Improvement in the Memory Span for Digits. KATE GORDON, University of California, Southern Branch, Los Angeles.

A test of the memory span for digits was given as a class experiment with two groups of university students. A practice series consisting of the digits of the Stanford-Binet Scale was used, but the test series consisted of groups of nine digits. These were pronounced at the rate of one per second, and immediately after hearing one group, *e.g.*, 5 2 7 8 3 9 1 6 4, the student wrote it down as well as he could. The results were scored as right or wrong. The first class (numbering 93 persons) were given 25 such groups of digits. The exercise was divided to spread over three days. On the first trial only 13 persons reproduced the digits correctly. On the last trial 39 persons succeeded. The second class (76 persons) were tested in the same way, except that they had 30 trials. On the first trial 8 persons were able to give the digits correctly, and on the last trial 29 persons. Smoothing the results by averaging in blocks of five trials, we find for the class of 93 subjects, 20, 26, 28, 37 and 36. Similarly the class of 76 gives 16, 21, 31, 29, 36 and 33 persons with perfect scores.

An Amplification of the Lipps-Meyer Law. PAUL R. FARNSWORTH, Stanford University.

Tones are related to each other in a numerical fashion. Thus the frequency of c is to that of g as 2 is to 3. F is to c as 2 is to 3. The Lipps-Meyer law states that listeners prefer to end a series of tones on the ratio 2. In the examples listed, an ending on c gives more favorable repose than an ending on g, and an ending on f gives more repose than an ending on c.

It has been assumed heretofore that no other repose effects are present. The writer, however, has demonstrated that with large groups there is a marked tendency to attach more repose to the ratio 3 than to the ratio 5, and more to the ratio 5 than to the ratio 7. The writer has further demonstrated that familiarity with a particular ending will increase its repose effect.

The Lipps-Meyer law should therefore be modified to read: "Endings display repose effects in the inverse order of the size of their ratio primes. Specific training can markedly change this order."

Differences in the Achievement at the Williams Institute. ESTHER ALLEN GAW, Mills College, Oakland.

A study of the Stanford Achievement Advanced Examination Form A, given at the Williams Institute in Berkeley to 43 children of from 8 years 8 months to 13 years 6 months of age in Grades IV to VIII shows the following results:

Compared to the Chronological Age the average Achievement Ages are high;

Compared to the Stanford-Binet the children are higher than to be expected in everything but arithmetic and spelling;

When the children are divided into Group I, those in this school one year or less, and Group II, those in this school $1\frac{1}{2}$ years to four years, and the difference between the Mean in Achievement and in Stanford-Binet is considered relative to the sigma of the difference of the means, Group II is shown to be decidedly superior in all but arithmetic, where Group II is slightly better but not significantly so.

Mental Changes in Paresis, as Studied by Certain Intelligence Tests. HELEN MARSHALL, Stanford University.

Growing out of a general attempt to apply intelligence tests to psychiatric cases in the neuropsychiatric clinic at the Stanford Medical School, a special study of the mental changes in paresis is being

pursued. About one hundred paretics have been given a complete Stanford-Binet, a smaller group have been given the shorter form of the Pintner-Patterson Performance Test, and a part of the group have been retested on the Stanford-Binet after an interval of one year or more. In addition to the cases of early paresis found in the Out-Patient Clinic, a group of late cases are being studied at Agnew State Hospital, through the coöperation of the staff there. It is planned also to study a group of cases being treated in the Skin Clinic for vascular syphilis, in order to determine whether there are certain predisposing features in the mental make-up of paretics.

No conclusions can be drawn at this stage of the investigation.

The Civilian Re-adaptation of a Group of A.E.F. War Neurotics.

NORMAN FENTON, State Normal School, Tempe, Arizona.

Base Hospital 117, A.E.F., was the only special base hospital for war neuroses which functioned throughout the active military period of the A.E.F. A follow-up of representative cases of this hospital consequently gives insight into the present condition of a typical group of war neurosis cases. Two such follow-up studies were made at the National Committee for Mental Hygiene in New York; the first in 1919, the second, five years later, in 1924. On both occasions about 1,000 men were reached. So far as those groups were concerned the armistice was not a very significant therapeutic incident. Some 40 per cent of the group reached in 1919 were in actual difficulty, unable to work and seriously affected by their symptoms. In 1924 there were 20 per cent so handicapped. There were no prominent psychotic outworkings in these groups; the number so affected being equal to the normal expectation from a group of men of this size; only four suicides occurred. Cases having diagnoses indicating true battle neurosis, such as concussion, gas, exhaustion, are making better civilian readaptations than the more chronic types, such as neurasthenia, psychasthenia, hypochondriasis, effort syndrome. Men of better education and men in professional or clerical work were doing better on the whole than the poorly educated and than those in other occupational types. Of those reached, 39 per cent were in worse jobs than they had held before enlistment, and 21 per cent had made no advance by 1924 over their pre-war status. Age, and family and personal history prior to enlistment, were not significant factors in civilian readjustment. Divorce in this group is much higher in 1924 than in the census figures for men of similar ages.

Aphasia. SHEPHERD IVORY FRANZ, University of California, Southern Branch, Los Angeles.

Different classifications and explanations of the aphasic state were noted. A case of aphasia was cited which had been under reëducation treatment, and which in its recovering stages did not correspond with any of the classifications or explanations previously suggested. It is obvious that too little attention has been paid to the phenomena of recovery, and that explanations based on static studies can only be partial. Because of this, less theory and more study of the aphasias are needed before we shall be able to say that we understand them.

The Determination of a Scale of Mental Ability. TRUMAN L. KELLEY, Stanford University.

In order to avoid the difficulties and absurdities encountered when using mental test scores expressed either in the raw units or in mental age units, it is desirable to express test scores in terms of sense difference units, since by their very nature these units *mean* the same throughout different ranges of the scale. Three groups of school children were studied, eight-, eleven-, and fourteen-year-old children each in the normal grade for their age. In each group the number of children not regularly promoted (that is, not promoted or doubly promoted) is a measure of the variability of the group in terms of differences as sensed by teachers and principals responsible for promotion. We will call the deviation from the average that a child must show before he is not regularly promoted a "confident sense difference," meaning thereby that the teacher or principal responsible for the regular promotion is confident that a difference from the average, of the sort implied, actually exists. Calling the "confident sense difference" as determined from a first age group equal to that determined from a second age group provides a basis for equating the variabilities of the three groups in terms of these sense differences.

Stanford Achievement Test scores were converted into units proportional to "confident sense units" and an achievement scale using these comparable sense difference units was built up. Norms for different ages 5.5 to 16.5 years by yearly step, *i.e.*, 5.5, 6.5, 7.5, etc., in terms of these units are respectively 5, 11, 20, 31, 44, 55, 68, 79, 87, 92, 97, and 100.

A casual inspection of this series shows that in terms of meaning, a year's growth is a very different thing at different ages.

Follow-up Work on Cases of Misclassification of Children. GRACE M. FERNALD, University of California, Southern Branch, Los Angeles.

The cases of misclassification on which our study is based may be divided into four groups: (1) Children who are classified as feeble-minded without a mental test; (2) cases diagnosed by inadequately trained persons; (3) cases in which there is an error in chronological age; (4) cases in which the child's vocabulary is limited because of non-English-speaking parents.

Our study of children in the first group includes twenty "non-readers," classified as feeble-minded by school authorities. All of these children have made normal progress in school and have achieved normal grades in educational tests after special work in reading.

The second group comprises children diagnosed as feeble-minded by inadequately trained persons. We have data on twenty-two such cases. Two of these are orphan children whose proper care was interfered with because of a feeble-minded diagnosis. The first, after six years of normal home and school environment, is a junior in high school and very gifted in music. In all cases we have a school record and an achievement record, as well as a later mental test showing normal mentality.

(In the third group the "feeble-mindedness" was based on an incorrect chronological age. On account of the failure to keep birth records in many states, it is often impossible to verify the child's age. Such errors would not be made if sufficient attention were given to the nature of the response. These errors seem to be made by persons who depend solely on a mathematical ratio for their diagnosis and who are not sufficiently familiar with feeble-mindedness to differentiate between the response of a normal younger child and a feeble-minded persons.

Group four consists of foreign born or those who have non-English speaking parents. No account seems to be taken by many testers of the fact that a child may have a fluent use of a limited vocabulary and yet fail to comprehend many idioms used in any given mental test.

A fifth group, which might well be included in any study of errors in diagnosis, is, of course, that composed of psychopathic individuals for whom a rule of thumb diagnosis is particularly absurd. So much attention has been given to this type of case we need only mention it.

Conclusions: (1) Tests are of great value in all cases of Group I, as they establish the normalcy of child and suggest methods of instruction. (2) There should be some check on the wholesale testing and classifying of children. No diagnosis should be considered final unless it has been verified by follow-up work and observation. (3) The diagnoses of a large group of inadequately trained persons are being accepted as final, in many cases, with great injustice to the child diagnosed. Qualification for testing would seem to require (a) adequate training in psychology, (b) extensive experience in the actual handling of normal and atypical children.

A Program of University Personnel Research. LEWIS M. TERMAN and KARL M. COWDERY, Stanford University.

Phases of personnel work which must be emphasized in the university have to do with the qualifications, abilities and interests of students, and especially the need of research in new fields of testing and rating. However, a personnel department cannot confine itself exclusively to research. One of its most important functions is to serve the various committees and officers of the university who are carrying on the administration of teaching and student activities. It must be able to supply on short notice significant data needed by the committees on scholarship, admission, registration, vocational guidance, honors courses, graduation, etc. Coöperation with the dean of men and dean of women is definitely implied. The work of the appointment secretary could be made much more effective by the use of data available from personnel research. Like the research division of a large industry, the personnel department of a university should, without the handicap of executive or instructional duties, be constantly engaged in testing the materials, processes, and products with which the university is concerned. It must be able to supply many kinds of needed facts regarding student personnel, and a balanced interpretation of those facts, to the committees and administrative officers who can most effectively put them to work.

Psychological Work in Los Angeles Police Training School. ELLEN B. SULLIVAN, University of California, Southern Branch, Los Angeles.

In 1923, August Vollmer, Chief of Police in Berkeley, was called upon to undertake the reorganization of the Los Angeles police department. Our work was concerned first with the initial survey

of existing personnel and later with the students of the Police School and the civil service applicants for entrance to the Police School. The tests in this initial survey were given by Dr. Grace Fernald, Dr. A. S. Raubenheimer, and Dr. Ellen B. Sullivan. Later tests at the Police School were under the direction of the Department of Psychology of the University of California, Southern Branch.

The initial survey included the entire police department of 1,712 acting officers. Two forms of the Army Alpha test were given to each man. Later the Terman Group and National Intelligence tests were given to those men making a score less than 50 of the second Alpha. The results disclosed a wide range of ability. The mean score on the first test was 82 and on the second test 102. All grades of officers were found receiving the low scores. Seven per cent of the officers ranking above patrolmen scored C— or less. Twenty per cent of the total force scored less than 65.

Later work included testing men who were in training at the Police School. The test work here was aimed to assist in eliminating those not able to profit by training. Two tests were given here. The second test in each case was the Army Alpha. The first test given to each of four groups was the Alpha, National, or Terman Group. In these four groups tested between September, 1924, and April, 1925, 824 men were included. The mean score on the second test was 116. Of this group 7 per cent testing below 65 were eliminated.

During May and June of 1925, 624 civil service applicants were given the tests. The mean score on a second Alpha was 90, with 15 per cent falling below 65. Selection will be made from this group for the succeeding Police Schools. As a result of the improved methods of selection, training, and placement of new officers the general level of the department is being rapidly raised. Less than 2 per cent of the 750 men graduated from the Police Training School have failed to make a satisfactory adjustment.

Notes on the Private Practice of Psychology. J. HAROLD WILLIAMS,
Los Angeles, California.

The private work to which these notes refer is in connection with the Los Angeles Diagnostic Clinic, which is made up of two departments, designated respectively neuropsychiatric and psychological. The clinic aims to provide complete service in the nature of diagnosis and therapeutic recommendations for cases in which the resources of mental science can be of benefit.

Persons presenting problems of social adjustment or deemed to be suffering from psychoneuroses, psychoses, neurosyphilis, or other disorders of the nervous system, are accepted for diagnosis. Difficulties or temperamental deviations also fall within the scope of this clinic.

The promoters of the clinic take the position that social maladjustments, whether so severe as to be classifiable as disease or not, can more effectually be dealt with by prevention than by attempts to cure. The keynote of mental hygiene is in taking stock in early life of an individual's mental endowment, taking cognizance of special abilities which he may have or disabilities with which he may be handicapped, and thus furnishing a scientific basis for vocational guidance and systematic assistance toward his general adjustment in life.

The clinic has made satisfactory working connections with various other organizations. The psychological division, through the use of standardized mental, achievement, and special ability tests, is able to make important contributions to the diagnosis of many types of cases.

The experience at this clinic indicates that there is a growing demand for psychological work, and an increasing appreciation of its usefulness.

Certain Relations Between Reward and Learning in Animals. HUGH C. BLODGETT, University of California, Berkeley.

An Attempt on the Mental-Inheritance Problem. RAYMOND R. WILLOUGHBY, Stanford University.

Intelligence Quotients of Three Hundred Geniuses in Childhood. CATHERINE M. COX, Stanford University.

Gestalt Pattern. WOLFGANG KÖHLER, University of Berlin.

OUR MASS NEUROSIS

BY TRIGANT BURROW, M.D., PH.D.

Psychiatrists and psychoanalysts have as yet confronted but the half of their real problem. In confining their study to the individual's unconscious they have entirely neglected the mass or social unconscious of which the individual is a part. This conclusion is not based upon abstract theory but is the outcome of definite experiment in the study of social reactions through the analysis of individuals in groups.¹ Supplementing the analysis of the individual's complexes and repressions with sessions devoted to the collective analysis of the social mind, the view is experimentally warranted that nervous disorder and insanity are not restricted alone to the isolated individual but that the actual presence of demonstrable disordered mental states exists unrecognized within the social organizations that form our present day civilization.²

It is futile to attempt to remedy mental disease occurring within the individual mind as long as psychiatry remains blind to the existence of mental disease within the social mind. The invariable factor that characterizes mental disturbance in the particular patient is the presence of division or conflict within the personality. Experiments in the analysis of the social mind as collectively represented in group assemblage make clear the presence of this same inner discord and conflict within the mind of society as a whole. It is the paradox of mental disorder in our patients that repression and concealment are its telltale. Likewise the examination of the expressions of the social personality indicates that concealment and repression are no less the secret witness of its disordered condition.

In dealing with the phenomena of the physical world the relativists have introduced a wholly altered basis for conceiving of these phenomena. The static Newtonian system is found no longer tenable in the altered conception of Einstein. The aspect of the theory of relativity, however, that is perhaps of central significance, is its sur-

¹ "Die Gruppenmethode in der Psychoanalyse," paper to appear in a forthcoming issue of *Imago*, Vienna, Austria.

² "The Laboratory Method in Psychoanalysis," paper read before the Ninth Congress of the International Psycho-Analytical Association, Bad Homburg, Germany, September, 1925. *Amer. J. Psychiat.*, 1926, 5, No. 3.

render of a position of unquestionable fixity or absolutism and its replacement by a system that posits relative values in respect to time and space.

There is, I believe, the necessity for a similar adjustment of our present evaluations in the sphere of consciousness. Like the Newtonian basis, the system that at present comprises the sphere of our human reactions is too circumscribed and static. It limits our observation of intrinsic data, and confines man's outlook to standards of measure that are arbitrary and imperial. As this rigidity, this autocracy of outlook, regarded in the larger survey, is the basis of our present system of consciousness, I should like in this study to make clear, if I can, just what I understand to be this unconscious absolute as compared with the more inclusive outlook of a relative basis of consciousness.³

It is the invariable condition of our present basis of mental exchange that every criterion of judgment within the affective sphere is dependent upon the personal predilection of the individual who judges. Within this systematization of preferences that forms the background of experience the judgment of the individual is not, as we suppose, the natural expression of a spontaneous idea, but it is the reflection of the social systematization about him that he has unconsciously come to embody. Thus the individual is not sponsor of the idea for which he is spokesman, but rather he is unconsciously sponsored by it. Instead of actuating his ideas, he is actuated by them. And not only the individual but the collective personality is rendered equally servile to such unconscious systematizations.

Within this systematized consensus, every man's own judgment, however unwarranted, is rock-ribbed and unquestioned. Upon his personal basis of evaluation his personal opinion is beyond challenge. John Smith may claim that he is the Emperor Napoleon, and there is no argument that can successfully assail his position. Within his own mental system his judgment is entirely consistent and valid. His opinion is his criterion and his criterion is indisputable. Upon a social basis of analysis, however, it may likewise be shown that any individual living within our present social system of evaluations entertains a position that is no whit different from that of John Smith. Each of us maintains opinions merely by virtue of the assumed criterion of his own personal judgment. But such an absolute criterion of judgment necessarily presupposes an opposite term to

³ A Relative Concept of Consciousness, *Psychoanal. Rev.*, 1925, 12, No. 1.

which it stands contrasted. For every criterion is a standard of comparison and a comparison necessarily presupposes a dual or contrasting basis of judgment.

I do not think we realize to what extent we are unconsciously driven by this vicarious alternation between two terms both of which are mere projections of an arbitrary dualistic standard. This unconscious dualism is extremely significant. John Smith claims that he is the Emperor Napoleon in compensation for a secret sense of inferiority that places him at the extreme opposite pole to the conceptual standard represented by the Emperor Napoleon. But in the light of an inclusive analysis—an analysis that takes account of the reactions of groups of individuals—it may be shown that this obsessive element of the comparative dominates our entire mental outlook. One finds that just as every individual is, upon an absolute or comparative basis, inevitably at odds with himself in his personal evaluations, so upon an absolute or comparative basis he is inevitably at odds with others in his social evaluations. This circumstance is one of such subtlety, however, that it is well-nigh impossible to realize its import. We have learned from Einstein that a mathematical frame of reference that is fixed and unalterable is no longer valid from the viewpoint of relativity. Likewise in the mental sphere, when the individual judges from a frame of reference that is comparative or fixed, he necessarily judges fixedly.⁴ For in the nature of a basis of comparison the individual becomes, himself, the central point of fixation—the absolute standard of measure by which all observable

⁴ "Einstein's first great discovery was that there are many such systems of reckoning—many possible frames of space and time—exactly on all fours with one another. No one of these can be distinguished as more fundamental than the rest; no one frame rather than another can be identified as the scaffolding used in the construction of the world. And yet one of them does present itself to us as being the actual space and time of our experience; and we recoil from the other equivalent frames which seem to us artificial systems in which distance and duration are mixed up in an extraordinary way. What is the cause of this invidious selection? It is not determined by anything distinctive in the frame; it is determined by something distinctive in us—by the fact that our existence is bound to a particular planet and our motion is the motion of that planet. Nature offers an infinite choice of frames; we select the one in which we and our petty terrestrial concerns take the most distinguished position. Our mischievous, geocentric outlook has cropped out again unsuspected, persuading us to insist on this terrestrial space-time frame which in the general scheme of nature is in no way superior to other frames." "The Theory of Relativity and Its Influence on Scientific Thought, *The Scientific Monthly*, 1923, 16. Arthur Stanley Eddington, F.R.S.

phenomena are evaluated and compared. When John Smith states that he is the Emperor Napoleon he entertains the secret alternative that other people *are not* the Emperor Napoleon. From his systematized basis of evaluation as fixed observer he arbitrarily estimates as fixed the position of others as well as of himself. He does not realize that from a position of fixation he necessarily makes fixation a basic condition of the mental universe about him. He does not realize that when he judges from a position of fixed alternatives he is but reflecting the position of fixed alternatives which first placed him as a child in the position of inferiority to his Napoleonic father.

This nip-and-tuck element expressed in the ambivalent processes underlying the absolutism of the individual neurotic are the familiar earmarks of his divided outlook. But if we will look at the social organism we shall find that a similar pro-and-con attitude, that a like ambivalence of motive, also underlies *its* manifold processes. Just as the dogmatic affirmations of the neurotic personality are lacking in organic authority and express themselves in a division or conflict within the individual personality, so the insistent affirmations within the social mind lack the corroboration of biological unity as shown correspondingly in the division and conflict of judgment that underlie the expressions of the social mind. For upon a relative or inclusive basis of analysis it becomes clear that an essential division, an inherent discord, underlies the social unconscious that is comparable to the discord underlying the unconscious of the individual. And it is of greater significance still that the judgment of the individual rests invariably upon acquired inferences derived from this absolute position based upon the equally fixated alternatives of the social mind.

Nothing is so characteristic of the social consciousness as this division or conflict that is its basis. Its presence confronts us at every turn. It is present in our concept of good and bad, success and failure, hope and despair, rich and poor, aristocrat and proletarian, Jew and Gentile, Catholic and Protestant, Freudian and anti-Freudian. Indeed the list of antagonists is infinite. One of our newspapers presented a prize contest for the best definition of a Republican and a Democrat. An answer sent in was as follows: "A Republican is a person who thinks a Democratic administration is bad for business. A Democrat is a person who thinks a Republican administration is bad for business. Both are right." The answer won the prize.

We have seen that either component of the individual's criterion necessarily contains the other. Whoever tends to feel his own impor-

tance entertains an equal conviction of his own insignificance. A criterion of goodness necessarily entails an alternative of badness. Also if we will examine the above social comparatives⁵ we shall discover the rather startling circumstance that likewise neither element in any one of these alternatives may exist in the absence of the other. For due to our present absolute basis the advocates of a system are necessarily the unconscious adversaries of that system. A man who is moral is just in so far immoral. Whoever is a Jew is also a Gentile. In the degree in which an individual is a Catholic, to that precise degree he is also a Protestant. Those who are Freudians are self-convicted anti-Freudians, though we have been thus far adroit enough to avoid our dilemma on the plea of resistances. This brings us to the circumstance that is of most vital interest to the present study: *The advocates of a system based upon the ambivalent contrast of conflicting alternatives are no more accessible to argument than is John Smith with respect to the system that is his own ambivalent self-estimate.*

Every Roman Catholic knows absolutely that he is right. And, absolutely, he is right since his criterion is absolute. For to hold the personal criterion with its self-advantageous basis of comparison is to become the self-appointed and supreme arbiter of the outlying universe. Accordingly, within this system of his own personal judgments the Catholic is inaccessible to argument. That is, by virtue of the absolute or personal basis of his judgment, what he knows and what is right are synonymous. The Protestant also knows of course that he is right, and of course on the basis of his absolute criterion he is equally so. For it is the unconscious merit of the absolute basis that it automatically makes right whatever is comprised within that basis. A basis, however, that makes tenable two such mutually opposite and exclusive positions as those of Catholic and Protestant is a basis of irreconcilable conflict. It is such a conflict that is the penalty of an absolute system of values both personal and social. It is such a system that is the meaning of our present basis of consciousness.

⁵ In the psychological use of the term "comparative" I mean to convey the state of mind that is as definitely one of moral contrast as the state of mind involved in the use of the grammatical comparative is one of conditioned or mental contrast. The mother who counsels her child to be "a good boy" is really telling him to be *better than* other boys or to be *better than* he was at some previous time. In brief, a standard of "goodness" is necessarily a standard of "betterness."

It is the essence, however, of the absolute system that it does not see beyond its own system. This is its fixity. This is the fiction of its authenticity. For a division that is due to a basis of absolutism preserves its division by virtue of that selfsame absolutism. Within his own system the Catholic is naturally supreme in his position and the Protestant is no less absolute and unimpeachable in his. As their criterion is impregnable, their division is impregnable. But again an inclusive analysis shows us that each is in the precise position of John Smith who, possessing royal prerogative, is, like his Napoleonic father, justly heir to the imperial throne to which he lays claim. But whether Catholic, Protestant, or paranoiac, under our present absolute system there is no power that may be invoked to enforce his abdication.

Urged by the impetus we have received from Freud, it has become objectively a quite simple matter to view with analytic exactness the conflict that is the basis of the neurotic personality. But as yet we have been led unconsciously to assume socially the position of onlooker in judging the mental conflicts of the neurotic individual. We have been led to assume a position socially that is not less absolutistic and arbitrary than the position assumed individually by the neurotic personality. It seems to me that it is now time that we lay aside our fixed and absolute position of mere detached observers and that from a relative and inclusive position we come to view the larger neurosis of the social organism that equally involves ourselves as elements within it—that we come to study with scientific disinterestedness the division and conflict which we ourselves embody as participants in the social personality, in order that through an understanding of our social neurosis we may reach a position of consciousness that permits a wider and more inclusive encompassment of life.

Freud struck strong against the establishment and the establishment has struck back strong in return. Freud's was a violent reaction against a violent condition about him. But thus far both sides have merely been antagonistic one toward the other. As long as such retaliative processes and mere counter-reactions are permitted to hold sway, we are merely marking time. There is not the possibility of progress toward larger and more inclusive outlooks. The establishment, having taken its stand, has declared that it is here to stay. Freud, having taken his, has declared no less stoutly that he is here to stay. But no system is here to stay. It is the here-to-stay attitude of mind that is precisely the fallacy of the system as it is the obstinate unreasoningness of all establishment. As long as there

persists the mutual antagonism of two equally immovable positions there remain only the unproductive friction and impaction of mere animosity and competition. While such comparative standards prevail we may only clothe ourselves about with the outward gestures and symbolisms that are the mere disguises for growth. Though each disputant claims on the authority of his personal system that he is right, his personal system renders him upon analysis as undependable as John Smith. As long as our criterion rests upon the dual standard of an unconscious absolutism we are embroiled in the inaccessible conflict of the absolute alternative. Under such a system, wherever there are two opposed opinions, necessarily both are wrong. Once more it is to revert to the ambivalent and comparative. It is again the two-edged criterion of all absolute measure.

There is required not that the Catholic's position be imposed upon the Protestant, nor that the viewpoint of the Protestant be imposed upon the Catholic, nor is it required that between them they agree to the adoption of a common mean. But it is necessary that through an analysis of the complexes of both we resolve the absolute fixation determining the alternations within each.

What is needed is not to shift the direction of the alternative but to eradicate the tendency to alternation. Although a patient's secret criterion of self-supremacy may be challenged by us in its fixation upon home and mother, he promptly finds an equally satisfactory lodgment in the ministrations of the psychiatric institute or in the consultation room of the psychoanalyst. Though we rout a patient out of a depression, he still retains his secret criterion either through the alternative of a frank elation or by means of the ever-ready alternatives offered in the unconscious subways of the social consensus.

Our dilemma, however, exists under conditions of such subtlety that, as I have said, it is well-nigh impervious to analysis. Its subtlety lies in the self-involvement of the thought processes responsible for it. For the inadequacy of our present mental system of evaluations is its failure to include in its envisagement the basis upon which we evaluate. On the contrary, a basis of relativity possesses the distinctive significance that it includes its own process within its own envisagement.

From these considerations I have come to feel that a basis of relativity is as essential to an inclusive understanding of our human reactions as it is requisite to a comprehension of the data pertaining to physics or astronomy. I feel that a relative viewpoint is as essen-

tial to a clear understanding of the subjective processes within us as of the objective processes that surround us.

In a relativistic and inclusive comprehension of consciousness an absolute system of criteria with its personal basis of evaluation and its irreconcilable dualism and conflict will be no more possible within the social personality than it will be possible within the individual. Just as we may view the individual from a relativistic position, so we may view the organism comprising our own social processes from a relative and inclusive viewpoint. From indications following several years devoted to an intensive study of processes dependent upon group or social reactions⁶ it seems to me a not too extravagant prediction that the basis of computation that has lately been replaced within the physical universe because of its absolutism and non-inclusiveness will also require to be surrendered for an equally inclusive basis of evaluations within the sphere of our conscious processes.

⁶ Social Images Versus Reality, *J. Abnorm. Psychol. and Soc. Psychol.*, 1924, 19, No. 3. Psychiatry as an Objective Science, *Brit. J. Med. Psychol.*, Vol. 5, Part 4.

SPECIAL REVIEWS

DRIESCH, HANS. *The Crisis in Psychology*. Princeton: Princeton University Press, 1925. Pp. 275.

The subject matter of this book was presented in the form of lectures during 1922 and 1923 in Peking, Nanking, Tokyo, New York. Professor Driesch believes psychology is passing through a critical period. In this book he undertakes to point out the actual crisis and to also "lay the foundation-stone of a psychology which will not be forced to pass through a *critical* state again, at least in the near future" (p. ix). The four problems which he regards as of the first order are: (1) the *mind-body*, (2) the *unconscious*, (3) *psychical research*, (4) *normal psychology* pure and simple (p. x).

Driesch's system is based on the "irreducible and inexplicable primordial fact: *I have something consciously*, or, in brief, I "know" something, knowing at the same time *that I know,—scio me scire*" (p. 1). "Psychology, then, is the theory of the variety of all the *somethings* which I may *consciously have*, and the laws which govern the sequence of these various *somethings* in time" (p. 2). Mind is not only the *consciously having* of something, but the something which I have is ordered or orderly (p. 73). A rough and perhaps a too brief analysis shows the system to consist of: (1) The pure qualities or suchnesses, *e.g.*, green, cold, hard, red, etc. (2) Data with regard to space and time, *e.g.*, nearness, beside, before, after, earlier, etc. (3) Pleasure and discomfort. (4) The accents of order, *e.g.*, this, such, not, related, so many, because, etc. (5) The accents of truth, *e.g.*, being in order, of being final with regard to order, etc. (6) The accents of existence. The elements under the accents 4, 5, 6, are the "meaning" elements. For Driesch *meaning* is an element, irreducible, in about the same way that *sensation* is regarded as irreducible by the structuralists. "Elements *qua* elements are probably never possessed consciously. It even seems as if every psychical content were made up by at least one element of each of the six groups enumerated" (p. 22). Such a content is called a complex. Complexes in turn may be classified as: (1) Sensible complexes (a) body-like sensibilities, (b) shadow-like sensibilities. (2) Thoughts. (3) Feelings. Professor Driesch claims for this

system that it differs from almost all earlier psychological systems in two different respects: "Firstly: *Meaning*, which had been overlooked in its objective character in almost all former systems, has got its proper place in the theory of elements: *I have consciously* various forms of meaning or significance just as *I have 'green'* or the note '*re.*' For this reason our psychology will not fail to explain the very complex meanings of which our whole conscious life consists. Secondly: We do *not* speak of a *conscious activity*, which had been regarded as a self-evident fact by earlier psychologists. No such activity exists! Psychical doing, becoming, performing, and, therefore, thinking and willing also, taken as *processes*, do not belong to the *conscious sphere*. But where, then, do they belong?" (p. 42). We may anticipate the conclusion here by indicating provisionally that they belong to the activities of an *unconscious soul*.

After a criticism of Association and its laws, and So-called Reproduction, the conclusion is reached "that *my soul* is the unconscious foundation of *my consciously having* in its totality and temporal sequence. In *my soul* there is continuous becoming, subject to certain forms of causality, while *I*, as we know, *have consciously* in a discontinuous form that is comparable to the sparking of an electric machine" (69, 70). The concept of the soul is a postulate which Driesch believes justified in making "since I know by intuition that in this way there will be order in the totality of all *my having consciously* in the course of time" (p. 70). In the comparison between sensation and action we learn that "The opposite of sensation is *action*. My body, while receptive in sensation, is also active. The one is the reverse of the other. Roughly speaking, there is, in sensation, the sequence: stimulus; irritation of sense organ, sense nerve, center; affection of mind, *i.e.*, sensation; in action the sequence: "will"; affection of brain center, motor-nerve, muscle" (p. 100).

Beginning with the heading "The Other Ego" the reader is carried through a discussion of the various relationships which may exist between mind and body, to the final conclusion that "The brain is a preformed system of almost innumerable *possible* connections. The mind uses this system, establishing *real* connections according to its unifying principles. The brain+soul=entelechy, *like* a great telephone station plus its personnel" (p. 148). For a more complete description of the nature of entelechy we are referred to the author's earlier *Philosophy of the Organism*, 1921. This must be a great disappointment to those who have tried to follow Driesch and who have hoped that "*The Crisis*" would be more, rather than less,

illuminating on the nature of entelechy. Have we here another *something* which is *nothing*? It seems so to the reviewer.

There follow a number of chapters on the "Organization of Mind" in which dreams, hypnosis, dual personality, co-consciousness, subconsciousness, play important rôles. The chapter of Parapsychology covers telepathy, mindreading, clairvoyance, telekinesis, materializations, prophecy, all discussed as possible manifestations of the "Ego part of the soul, or the 'unconscious' soul in its totality, or a certain subconscious part of the soul" (p. 232). An attempt to review these subjects critically seems hardly worth while since Driesch himself concludes that "It is useless, however, to say more about a problem which we are sure we *cannot* understand in our present form of mentality" (p. 242).

As might be expected from an approach along these lines the "freedom of the will" becomes a pressing problem for Driesch. But whether the argument that "The whole phenomenon of *being conscious* would be a *superfluous* element in reality, a mere luxury, if there were no freedom" (p. 246) still carries with it the same plausibility that it did twenty years ago, must be left to the reader. Driesch himself seems to express doubt in the declaration, "And thus man may be a moral automaton! How to avoid this paradox I do not know!" (p. 252).

We pass to the formulation of the CRISIS in psychology. This is done under a five-fold division: (1) The theory of elements—Driesch does not present a comprehensive classification of these elements and though he "intuitively feels" that "meaning" as various accents of order, truth, existence, and probably others, does exist among the elements of the objects which we *consciously have*, our analysis is fragmentary and incomplete. (2) Determining tendencies—While "people were aware that enrichment in meaning and in truth was the chief characteristic of mental life . . . this feature could not be explained by association" (p. 264). It can only be explained by the existence of definite limiting and directing agents (unconscious determining tendencies) though here, as with the elements, more analysis is necessary. (3) Dynamic agents—The most primitive of all the dynamic agents of the mind is an *unconscious* agent, only the results of its working being conscious. Other phases of these dynamic factors are represented by subconsciousness, hypnosis, dissociation, complexes, and the like. The more complete classification of these dynamic agents still awaits the investigator. (4) The mind-body problem—Psychomechanical parallelism must be

rejected in favor of the analysis of action as a nonmechanical phenomenon in nature. The analysis of the manifoldness of "The Psychical" must be carried further. (5) The problems of psychical research, with all their implications of immortality, clairvoyance, materialization, etc.

Just to what extent these five divisions are engaging the energies of the psychologists in this country, it is of course difficult to say. After even a hasty glance at the literature or through the theoretical chapters of the many textbooks that are coming off the presses, the conclusion seems inevitable that Driesch's crisis is largely one of his own making. His problems are not our problems. Perhaps they should be, but the fact remains that while we are far from agreement among each other on the fundamental assumptions which should underly the study of psychology, we are certainly not assuming that biological and psychological vitalism have overthrown mechanism (p. 267). In this lies the improbability that Driesch's system will be generally adopted in this country. And his hope that he has laid "the foundation stone of a psychology which will not be forced to pass through a *critical* state again" (p. ix), probably rests more upon a complacent survey of his own system than it does upon a survey of what is actually happening among psychologists. Driesch's system rests upon the postulates that there is an indefinable, indescribable something, the soul and entelechy. Neither of these postulates rests upon anything more secure than "intuition" (p. 70). Whether psychologists, as soon as they realize (as Driesch does) that they must formulate their own fundamental assumptions, will accept *intuition* as the justification for a postulate remains to be seen. It seems more likely that the fundamental postulates of psychology will be derived in the same way as they are derived in the natural sciences, *i.e.*, from those objects and relations between objects which can be demonstrated to other individuals. That which historically has been described under the abstract term soul, consciousness, mind, will, etc., has such a limited and restricted reference even for a single individual that any inferences which are made soon expand into such purely personal classifications that all unity among individuals is lost. A recognition of the need of this unity is the beginning of science, and the reviewer would add, the end of metaphysics. Driesch's clear exposition of his system has made it possible to point out the weaknesses of his type of metaphysical approach toward the

problems of psychology, weaknesses which can only be overcome by adopting scientific criteria in the formulation of the fundamental psychological postulates.

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KÖHLER, WOLFGANG. *Die physischen Gestalten in Ruhe und im stationären Zustand*. Braunschweig, 1920.

Introduction: By *Gestalten* (Ehrenfels) are meant "those psychic states and processes whose characteristic properties and effects are not derived from similar (artgleich) properties and effects of their so-called parts" (p. ix). Thus, a picture is more than a group of color sensations, a melody more than a succession of tones, a sentence more than a series of meaningful words. Ehrenfels states two criteria for a G (p. 35): (a) Take a musical phrase of, say, 20 distinct notes; if the first note were heard by one individual, the second by another, and so on, the sum of the experiences of these 20 hearers would be poorer than of one person who heard the 20 notes in their true temporal order. What these stimuli produce in one consciousness over and above what they produce in the 20 separate ones is the specific G feature or characteristic. (b) A G is transposable; although each of the 20 notes be raised or lowered in the same degree, the "melody" will still remain. That which survives this change of the component notes is the G. Though he uses these criteria, K considers the former necessary but not sufficient, the latter sufficient but not necessary (p. 37).

The G concept in psychology may be developed by experiment or by reference to the older sciences in which it is already known and used (p. x). The latter is K's procedure: he seeks to show that the concept is by no means peculiar to psychology, not a doubtful innovation of questionable scientific character, but rather is to be found everywhere in the fundamental science of physics. Psychologists have been misled into believing that the exact sciences explain every total process (*Gesamtgeschehen*) as a mere summation of component influences with their several effects; they have in consequence held away from the G conception as foreign to the procedure and theory of the more mature sciences (p. xix). By showing that G are common in physicochemical thinking, K hopes to make them acceptable in our own field; and by examining the general properties of physical structures, to throw light upon the nature of phenomenal structures (p. 174).

Physical Gestalten.—A group is a *sum* of separate parts only when it can be produced or dissolved without any of the components being changed (p. 42). The furniture in a room is a summative grouping of this kind, since one piece may be added or removed without affecting it or any of the others. The nonphysicist naïvely assumes that all physical groupings are of this order, whereas, in fact, non-additive systems, true structures, abound in nature (p. 49). An electrostatic charge, *e.g.*, cannot be increased, decreased or modified at any point without affecting its distribution throughout the whole conductor (p. 56). The charge at a given point is not one part of a total, but is rather a "moment of structure," which is carried by all the rest of the system and in turn conditions the whole (p. 60). Such static charges are physical G or systems, not mere aggregates (Ehrenfels' first criterion), whose structure depends indeed upon the form of the conductor (being denser at the edges), but not upon its material, its size (Ehrenfels' second criterion), its spatial position, nor the absolute amount of charge; indeed the charge itself is but part of a larger structure which comprehends the whole field about the conductor (p. 74). Two such conductors, when appropinquated, in turn form a new and unitary system whose energy distribution departs widely from that of either one alone (p. 79). Not only do static situations have G properties; so also do physical processes, like electric currents, whose flow is structured by the form and constitution of the whole conductor (p. 141).

Nature is neither a purely additive whole nor yet a whole without distinguishable parts (p. 153). That the universe is one gigantic structure in which we can understand a single process only by knowing the whole, may seem to be a logical consequence of the G doctrine; and while perhaps formally true, it would make science impossible. The greatest enemy of a fruitful G theory in psychology would be the analogous doctrine that only consciousness as a whole (*das Gesamtbewusstsein schlechthin*) can be studied (p. 157). The true doctrine, escaping both extremes, is that the universe comprehends a vast number of relatively independent G, each of limited range and each with definite G properties (p. 158). Structures therefore do not preclude the additive relation, they merely transcend and complete it. Structured physical material (electrons, say) can always be summed; but wholly different structures may of course yield identical sums, and to find by integration the amount of charge in a given conductor tells nothing at all about the distribution of the charge (p. 137).

Neural and Phenomenal Gestalten.—On coming to neural and psychophysical structures, K applies to the somatic field¹ Nernst's theory of electromotive forces between electrolytes; his doctrine therefore contains nothing restricted to biology or psychology, but is based instead on the fundamental properties (known or assumed) of electrochemical processes (p. 28). Excitations in the somatic fields, external conditions being constant, he defines as "quasi stationary"² chemical reactions in dilute solutions, in which ions participate" (p. 13). They are classed as quasi stationary (after the first few moments) because the fatiguability of nervous tissue is known to be relatively low (p. 9). Now let the receptive surface be activated by a strong and a weak stimulus (light and dark grey) side by side. All parts of the somatic field being in functional relation (immediate or remote) with each other, osmotic pressure at once arises between the two unequally excited areas (p. 16). The H-ions (+), being more mobile than the others, diffuse rapidly into the weaker solution, leaving the stronger one electro-negative (p. 24); a potential difference (p.d.) thus arises along the boundary of the two solutions. The more excited tract becomes negative to the other (experimentally proved), and the resultant e.m.f. is a simple function of the difference in excitation (p. 19). This holds for somatic areas connected by neurons as well, so that an e.m.f. may arise between *remote* points of the cortex. Stimuli of unlike quality (red and blue) evoke a p.d. as well as do those differing in luminosity (p. 22). Some p.d. inevitably results therefore *whenever the somatic field is differentially excited in any way* (p. 24). The well known prevalence of contours is due to the sharp p.d. along the contour lines (p. 26). K is careful to emphasize that the p.d. is not a true difference between two potentials previously existing; on the contrary, it comes into being only when the two solutions are side by side. The somatic field with its e.m.f. is then a true G; it has properties not found in either of its parts (first criterion); and both potentials may be raised or lowered relative to a standard like the earth, without altering the p.d. (second criterion) (p. 31).

Whereas by traditional theory we presume a vast number of

¹ By a "somatic field" is meant any region of the central nervous system (cortex) on which is projected a sensory surface (2). Adjacent elements of the latter are assumed to project on adjacent points of the central field.

² A process is "stationary" when, as it continues, no change occurs in the properties of the whole system; it is "quasi-stationary" when it changes so slowly as to be virtually stationary over short periods.

virtually independent sensory-cortical systems (sensations, reflex arcs), a cardinal postulate of the G school is that the whole sensory-somatic field, in both long- and cross-section, is a single unitary system for perceptual purposes (p. 176). Within the conduction tracts the neurons are of course isolated; but upon reaching the grey centers (cortex) they unite into a functional whole, which alone makes possible the orderly and integral structures of experience (p. 179). Not their peripheral isolation but their *central unity* is the cardinal fact about the conductive tissues. The cortex being then a physicochemical system, we may expect it to display the usual physicochemical G properties (p. 189):

- a. Each moment of a given process in the somatic field conditions, and is in turn conditioned by, all the rest.
- b. Structuration is just as real a feature of the process as are, say, the color reactions which it includes.
- c. Any one moment is more affected by near than by distant moments; hence, we find minor G within the total G.
- d. The distribution of energy may vary widely in the several parts of the field.

In experience itself, we find (p. 191):

- a. The perceptual field is a unity with supergeometrical properties.
- b. The integration and structure of a perceptual field are just as real as its color quality.
- c. Some parts of the perception are relatively independent of the others.
- d. Some parts of the field are more vivid and insistent than others.

In experience, then, we find the very G properties which the physicochemical nature of the somatic field would lead us to expect. The stimuli which condition a visual perception are usually summative manifolds (every point of a surface reflects a given kind of light without regard to any other point); but the resultant experience is far from being a correlative grouping of independent sensations; it is a G with unitary properties not found in the stimulus (p. 194).

Specific Problems.—1. The whole *optic sector* (retina to cortex) is a functional unit. An e.m.f. is known to arise within the retina when differentially stimulated, just as in the case of neural tracts (p. 199); so that excitation of one retinal element is bound to affect many or all others. A given impression (circle) furthermore continues to appear circular even when thrown upon widely differing

points of the retina; only if the whole sector is functionally homogeneous could this impression (circle) be thus projected without distortion from all parts of the retina onto the somatic field (p. 236). It follows that an impulse starting from a given cone of the retina does not invariably flow to the same cortical cell; on the contrary, it may pass to different cells from time to time in harmony with the whole *Strömungsgestalt* of the moment³ (p. 243). Any point-for-point correspondence of retina with cortex is then definitely abandoned.

2. *Coloration* in a perceptual field is known to be affected by the whole configuration. The somatic field being an electrolyte, its e.m.f. is attended by a displacement of material substance (ions or colloid particles) which tends to dam up where the flow is obstructed; this concentration or *Stauung* facilitates the chemical reactions underlying the experience of color. Color then is due not to mere local excitation of the retina but involves the whole sensory-somatic process (p. 209).

3. The whole optic sector being a unitary configurable system, it follows that one part (cortical) of a neural G may be attended by consciousness while the remainder (the retinal part) is not. The phenomenal G therefore need not be coextensive with the physical G of the sensory-somatic field (p. 202).

4. *Figure and Ground*.—Take a small white circle on a large grey field; an e.m.f. will arise along the whole boundary of the two unequally excited tracts. The area within the circle being much smaller than beyond the circumference, its electric flow or displacement will be correspondingly more intensive and concentrate; the circle will therefore stand out (figure) while the large grey field will be much less vivid (ground). The "figure" of a G, whatever its color, is then always the region of maximal energy density (p. 206).

5. *Weber's Law*.—Differential excitation, as we saw, invariably forms a p.d. in the somatic field, but as the disparity in stimulation decreases, the p.d. falls until it becomes too small to set up any e.m.f. at all; figure and ground then become indistinguishable and unite. Of two solutions, let ϕ_1 , ϕ_2 be the potentials and c_1 , c_2 the concentration of ions; then

$$\phi_1 - \phi_2 = k \lg(c_2/c_1),$$

³ This implies that retinal processes are conditioned by what is going on at the same time in the cortex; the activity of the whole retino-cortical field constitutes a single structure.

which correlates precisely with the formula for Weber's law:

$$S_1 - S_2 = k \lg(R_2/R_1).$$

The seat of Weber's law is probably in the retina, where the proportionality between stimulus and ionic concentration seems to occur (p. 219). We must remember, however, that the retina is a unitary part of the whole optic sector, as noted above.

6. *Structures Without Content*.—What would happen if somatic material (ions or colloid particles), which has no part in the chemical reactions underlying the experience of color, were to stream and form structures? We then should have a G without sensory quality, a form without content, a *pure space structure* (cf. Wertheimer's *pure phi*—movement without visual quality). In this way may be explained our *Vorstellungen* of spatial patterns with little if any sensory content; thus one "sees" the path of a billiard ball before making the shot; this *Vorstellung* has a definite G, but has it any color or visual quality? (p. 247).

7. A natural process begins in asymmetry (Curie), hence in running its course the process tends to restore symmetry, to approach a condition of lowest possible structure energy. A complex and irregular perceptual G tends therefore with time to become more symmetrical and regular; that is, to achieve the simplest possible structure (p. 258).

Conclusions.—The Gestalt doctrine may well seem to aggravate the difficulties of our field. In theoretical matters it provides no easy solutions. The distribution of an electrostatic charge on a single sphere, say, is indeed easy enough to find; but the structure induced by two charged spheres in close proximity has tested the skill of Poisson and a dozen other mathematicians (p. 93). We may be sure that neural structures are no less complex than these; but K thinks that Fredholm's theory of integral equations affords a general method for solving the fundamental problems of theory (p. 94). Experimentally we encounter the fact that introspection modifies the very patterns to be investigated; but the same difficulty appears in physical science as well. The empirical method of determining the density of charge in a conductor by touching a sounder to various points disturbs the electrostatic G even as introspection distorts the configurations of experience (p. 81); but if we know what errors a given method induces, we can proceed to measure and then to nullify them in the final result.

The limits of this review preclude any detailed critical appraisal

of K's book, the significance of which is becoming ever more widely appreciated. It provides an illuminating and thorough induction into the nature and implications of *Gestalt*, and at the same time offers to psychologists of every school a reasonable and substantial theory, not unduly hypothetical nor schematic, of neural function and its rôle in mentality and behavior. A good deal of theoretical Gestalt literature has, to the outsider, a kind of metaphysical not to say mystical form⁴ which, however clear and significant to the initiated, may wonder and even repel the neophyte; and it is often hard to glean from single experimental studies the precise nature and import of the G concepts as there employed; all the more useful therefore is K's book, which takes the reader by way of known facts or familiar concepts into the heart of G theory from which point the other literature reveals its true meaning and value.

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VON HELMHOLTZ, H. *Helmholtz's Treatise on Physiological Optics*.

Translated from the third German edition (with some new matter by A. Gullstrand, J. von Kries, and C. Ladd-Franklin). Edited by James P. C. Southall. New York and Ithaca: Optical Society of America. Vol. I, 1924, pp. xxi+482; Vol. II, 1924, pp. vii+480+2 pl.; Vol. III, 1925, pp. x+736+6 pl.

Helmholtz's *Handbuch der physiologischen Optik* is not only the classical work in the psychology of vision and of a scope and competence that has not since been approached, but, when taken together with his *Lehre von den Tonempfindungen* and Fechner's *Elemente der Psychophysik*, is one of the explanations of modern experimental psychology. These three books, appearing in the decade 1856 to 1866, were the practical justification of the new physiological psychology, and the subsequent success of experimental psychology in dealing with the problems of sensation and perception, while the new science dealt less surely and adequately with the so-called higher mental processes, might have been expected in a field of endeavor that received its original sanctions in this way.

The first section of the *Optik* was published in 1856, the second

⁴ Cf. the following typical statement from Wertheimer: In the psychophysical organism we have an apparatus (the mechanical implications of this term make it unsuitable) which is "möglichst tauglich zum Erfassen innerer Notwendigkeiten" (*Psychologische Forschung*, 1923, 4, 349).

in 1860, and the third in 1866. Meanwhile Helmholtz had brought out the *Tonempfindungen* in 1863. The first edition of the complete *Optik* is dated 1866. In 1896, two years after Helmholtz's death, the second edition with revisions by the author was published. To this edition was appended a long bibliography of 7,833 titles compiled by König. The three volumes of the third edition are dated 1909, 1911 and 1910, respectively. The editors of the third edition, Gullstrand, von Kries and Nagel, decided to reprint the text of the first edition rather than that of the second edition, partly because they believed that Helmholtz's pioneer work should be preserved as it stood, and partly because they concluded that the changes in the second edition had been in many cases tentative and represented the parts that stood most in need of further revision fifteen years later. The third edition was brought up to date by the insertion of additional paragraphs and chapters by the three editors. Thus more than a third of the text of the last edition was new.

There had never been an English translation of this work, although the *Tonempfindungen* has long been available in English. Accordingly at the meeting of the American Optical Society in 1921, the centennial of Helmholtz's birth, the society decided to undertake the translation of the *Optik*. The editor and his advisers faced the same problem as the editors of the third German edition and determined it in the same way. They decided to undertake the translation of the third German edition, including the new portions by its editors, and further to add a little new material. About 4 percent of the text of the English edition is entirely new; about 36 percent is the new matter of the third German edition; and about 60 percent is Helmholtz's text of the first edition.

The most extensive addition to the English translation (Vol. I, pp. 443-482) has been the printing of a translation of Gullstrand's chapter on ophthalmoscopy, originally printed in his *Einführung in die Methoden der Dioptrik des Auges des Menschen*, 1911. Gullstrand was one of the contributing editors of the third German edition. This section develops the optical theory of ophthalmoscopy, revising Helmholtz's fundamental proposition, and exhibits the principles under which practical observation occurs.

Von Kries, another contributing editor of the German edition, has furnished five new short notes for the English translation. One note (Vol. II, pp. 300f) deals briefly with visual contrast, where the Helmholtz theory of vision has been least successful, citing especially Hering and Jaensch. Another note (Vol. II, pp. 411-413)

is devoted to a criticism of Hess' conclusions as to variability within protanopic and deuteranopic vision. Still another note (Vol. II, 422-425) is an addendum to the section on "The Phenomena of Daylight Vision Under Conditions That Make It Difficult or Impossible to Recognize Colours," and deals with the time thresholds for colors, with Pulfrich's stereophotometry, and with heterochromatic photometry in relation to time thresholds. In the third volume von Kries has added a note (Vol. III, pp. 398-400) on the binocular perception of depth in three cases where the differentia of depth depends upon the movement of the stimulus. Finally, to his three notes on retinal rivalry in the German edition, he has added a fourth (Vol. III, pp. 530f) citing Trendelenburg's demonstration of the facts of true and precise binocular mixture of colors.

At the end of the second volume, after von Kries' appendix on theories of vision, is a new chapter (Vol. II, pp. 455-468) by Mrs. Ladd-Franklin on "The Nature of Colour Sensations." The first third of this chapter is an unfavorable criticism of the fundamental principles upon which the Helmholtz theory of color is based. The second third is devoted to some of König's work, the consideration of which in the second edition had been omitted from the third German and the English edition, since these editions reproduce Helmholtz of the first edition. The König color triangle and, in revised form, his distribution curves for the "elementary" sensations are reproduced. The final third of the chapter gives Mrs. Ladd-Franklin's own theory of color vision, calling it the "development theory." It is a clear concise statement of the theory with two colored diagrams, which would have been equally intelligible to the scientific reader without the expensive process of color printing. The development theory has many points to recommend it, and the decision of the editor to include it under the theorist's own authorship enhances the value of the work as a general reference book. The chapter is marred only by a personal evaluative style which contrasts strikingly with the scientific impersonality of the rest of the three volumes.

The König bibliography of 7,833 titles in the second edition was omitted from the third German edition because it could not be brought up to date. A complete bibliography, supplementing König's which extends down to 1894, has still to be compiled, an undertaking which the editor of the translation recommends. The translation contains the original bibliographies of Helmholtz, all of which the third German edition kept, the numerous citations in footnotes to the

new matter of the third German edition, many new footnotes to both the old and the new matter of the English translation, and three new partial bibliographies giving many references not included in the other lists although not pretending to completeness. These new lists are a bibliography on the anatomy of the eye, by Davenport Hooker, 194 titles, 1741-1922 (Vol. I, pp. 39-46); a partial general bibliography, by the editor, 336 titles, 1911-June 1924 (Vol. II, pp. 468-479); and another partial general bibliography, by the editor, 559 titles, 1911-May 1925 (Vol. III, pp. 689-705).

The translation is excellent. The German has not been widely departed from, and yet the English style is not at all like German done into English.

The editing has been careful and precise. In so extensive and complicated a work, errors must occur. However, the German practice of noting corrigenda where possible has been adhered to. Vol. II contains a list of 42 corrections of Vol. I; and Vol. III contains 17 more of Vol. I and 74 of Vol. II.

The pagination shows in brackets the corresponding page of the German edition, which in similar manner gives the page of the first edition. When the text of a page is by some author other than Helmholtz, the author's initial is added within the bracket. This system results in the translation in the printing of the author's initial without page citation for new material. Thus one can tell by a glance at any page whether the text is Helmholtz, new matter of the third German edition, or matter new in the translation.

While the editor notes appreciatively the assistance he has received at the hands of many persons, it is plain that the success of the translation is primarily due to him. Altogether it is a remarkable accomplishment and a worthy commemoration of Helmholtz's greatness.

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KATZ, DAVID. *Der Aufbau der Tastwelt Zeits. f. Psychol. u. Physiol. d. Sinnesorgane. Ergänzungsband, 11. Leipzig, 1925. 270 p.*

This contribution takes a place in the forefront of experimental studies of touch. The problems which it undertakes to solve experimentally are representative of the whole field of touch, and the author displays skill and ingenuity in the selection of suitable methods by which to approach these varied problems. A theoretical under-

current manifests itself here and there, but is never allowed to influence the experimental facts. The conditions, subjective as well as objective, of numerous touch experiences are carefully delimited and independently varied, so as to determine the precise rôle of each in the particular perception. The work follows the ever growing trend of scientific psychology in laying heavy emphasis upon the qualitative aspects of its problems. This book embodies two previous studies of touch, which appeared in rather inaccessible places, so that the reader will not find it necessary to search for those earlier studies.

Katz tells us that, even before the publication of his *Erscheinungsweisen der Farben* (1911), he was sufficiently interested in touch to make notes regarding certain of the problems which find treatment here; but his serious experimental attack upon the problems of touch dates back only to 1914, when he was working in G. E. Müller's laboratory at Göttingen. Interrupted by the World War, the work was constantly held in prospect, and Katz says he was ever busy making casual observations by that most important organ of touch, his finger.

The book falls into four parts: (1) the various modes of appearance of touch experiences; (2) experiments on the efficiency of the sense of touch; (3) further analyses of the efficiency of touch (in which the sense of vibration receives chief consideration); and (4) practical considerations in regard to the sense of touch. Section 1 covers seventy-four, section 2 one hundred and eleven, section 3 sixty-three, and section 4 seventeen pages.

Katz devotes less than a dozen pages to an historical approach to his study, and appears to find more to criticize than to commend in the works of his predecessors. The studies of Blix, Goldscheider, Donaldson, von Frey, Titchener and Thunberg have dealt too exclusively with "atomic" analyses of touch, and have therefore diverted the attention of psychologists from the more complex and more common touch experiences in which Weber in the first place was interested. The punctiform mode of stimulation is characterized as highly artificial. "Most men die without having experienced the stimulation of an isolated pressure or temperature spot"—it would appear that Katz is anaesthetic to the numerous pricks of everyday life—"or a genuine spatial limen" (p. 11). Katz also breaks with the historical tradition of touch experimentation in discarding the plaster of Paris cast and in characterizing the fixed position of the member as biologically inadequate and unnatural (p. 60ff).

Owing to the great wealth of facts included in the book, the writer of this review has chosen to present in the following pages an expository survey rather than a critical account of the work. Limitation of space forbids even the inclusion of more than a very general and abbreviated statement of the experiments, results and conclusions. For the full account the reader must be referred to the original.

Touch experiences exhibit a double aspect (*Bipolarität*): there is the strictly qualitative aspect which manifests itself in such experiences as roughness, smoothness, stickiness, oiliness, etc., and there is another aspect which gives information as to the specific nature of the material, *e.g.*, wood, glass, metal, of which the stimulus-object consists. The former mode of perception is conditioned largely by a subjective attitude, the latter mainly by an objective attitude of the *O*. Stimulation of certain parts—inside of ear or nose—characteristically brings into prominence the subjective aspect; stimulation of other parts, *e.g.*, the trunk, predisposes to objective perception. The subjective aspect predominates in thermal experiences, while movement favors the ascendancy of the objective aspect.

Katz distinguishes four chief modes of appearance of touch: (1) palpation of surface (*Oberflächentastung*); (2) spatial touch-qualia (*raumfüllendes Tastqualie*); (3) volumic touch phenomena (*raumhafte Tastphänomene*); and (4) mediate perception of surface (*durchtastete Flächen*). The tactual exploration of a piece of wood or cloth is an example of palpation of surface. The spatial touch-qualia is obtained from a puff of air on the skin or by moving the hand through a liquid. This spatial experience is distinguished from the experiences of surface palpation in several respects: it lacks definiteness of spatial form; it is dense without being determinately spatial; it characterizes a material, not an object; the subjective pole is more pronounced in it; and surfaces explored by palpation are characterized by impenetrability (*Undurchdringlichkeit*). As an instance of volumic touch phenomena Katz gives the thick stratum of soft mass which is perceived when we touch a small object, such as a match-box, covered by several layers of jeweler's cotton. The attention must not be given to noting the form of the underlying object, which, of course, can be vaguely perceived, if the attention is directed to it. The surface impression of the cotton must also be ignored if we are to perceive the volumic phenomenon. A mediate perception of surface arises when a piece of soft paper or cloth is held in the hand and rubbed to and fro

over the surface of an object. The impression of a thin layer or veiling, through which the nature of the underlying object is given, is clearly perceived. We have such experiences in daily life when gloves are worn.

The term "modifications" (*Modifikationen*) covers the great variety of different nuances in which touch qualities appear, and the characteristic manner in which the qualities mediated by surface palpation arrange themselves in serial order between opposite extremes, e.g., rough-smooth, hard-soft. Touches which inform us of the kind of material of which the stimulus-object is composed receive the general designation of "specifications" (*Spezifikationen*).

The organization of a number of discrete touch elements into a space filled with touch points, as in stimulating the finger by a small brush, demonstrates the existence of touch-figure (*Tastfigur*); the large number of small unstimulated or intervening spaces (*Zwischenräume*) lying among the discrete touch points constitute an instance of touch-ground (*Tasthintergrund, tactiler Grund*).

We have memory-touch of objects, such as glass and sand, just as we have memory-color of specific things. But touch ideas are not reproduced independently of the image of the touch organ itself. The touch organ which is usually projected in imagery in memory-touch is the finger tip.

Movement is an indispensable condition of the more complex experiences of touch; psychologists hitherto have not taken it seriously into account because of their absorbing effort to reduce touch to the very simplest terms. Movement is the only biologically adequate and normal mode of stimulation for touch and by it an absolutely new group of touch experiences is brought forth. Movement is necessary for palpation of surface, for spatial touch and for mediate perception of surface. It is also indispensable to touch modifications. Smoothness and roughness, hardness and softness, elasticity cannot be aroused without movement. Yet in spite of the objective necessity of movement for these various touch experiences, it does not at all enter subjectively into the conscious experience (p. 63).

The experimental study of the modifications of surfaces perceived by palpation was undertaken in what Katz designates his main or basal experiment (*Grundversuch*). The stimuli consisted of a series of 14 papers 10 x 15 cm. varying between a very smooth waxed paper at one extreme and a very coarse and soft cloth-paper (*Tuchpapier*) at the other. The steps between these papers were not of an

objectively determinate and uniform amount, but of sufficient amount so that any two adjacent papers were readily and correctly discriminated under normal conditions of observation. The eyes were closed and the ears stopped in all experiments. The papers were presented by the method of comparison. The *O*s were asked to assume an attitude such as would be employed in daily life in matching cloth or paper by touch alone. The instructions demanded report of likeness or difference only. In spite of the limited instructions every one of the four *O*s volunteered such objective information as blotting paper, writing paper, and reported that certain of the stimuli aroused warm and others cold sensations.

The other experiments in modifications of surfaces perceived by palpation consist in the methodical and independent variation of the several conditions of this main experiment. Reduction of the dimensions of the papers to 4 mm. square did not prevent correctness of discrimination or apprehension of the object material, but at 2 mm. square numerous inversions of judgment appear and realization of specific object-material is lost. If the finger is brought down on the papers with scrupulous care to avoid lateral movements, the information as to object-material as well as the ability to discriminate degrees of roughness and smoothness is entirely lost. Under these conditions the character of the explored surface is very vague and indefinite. The soft character of several stimuli was readily noted, however; and Katz concludes accordingly that lateral movement produces impressions of roughness and smoothness, while vertical movement conditions the experiences of softness and hardness. The specific object-reference is ruled out even more completely by keeping the stimulated member absolutely passive.

The discrimination of roughness and smoothness is slightly impaired when the papers are moved over the passive fingers by an appropriate apparatus, even at the optimal rate—15 cm. per sec.—for such discrimination. We are thus somewhat less sensitive to small degrees of roughness and smoothness in stimulating the passive member by a moving stimulus than in moving the fingers actively over the object. All degrees of roughness vanish, and all stimuli appear smoother than usual, if the papers are moved over the fingers at the rate of 60 cm. per sec. When the rate of movement is reduced to 3 cm. per sec., the character of smoothness is less pronounced, but roughness is discriminated as well as at the optimal rate. The 14 stimuli thus represent a more limited range of nuances of smoothness-roughness at either of the extreme rates than at the

optimal rate. Light pressure gives a more pronounced smoothness than strong pressure at all rates of movement.

The discrimination of degrees of roughness-smoothness is impaired surprisingly little when the fingers are covered by a layer of collodion of about 1/10 mm. thickness, or by a 1/5 mm. thickness of leucoplast. There is only slight reduction in discriminative capability when the *Zwischenmedium* lies loosely on the fingers, as in wearing kid or rubber gloves. The impressions here are not instances of mediate perceived surfaces, but rather resemble that of a finger which has just been burned. We do not clearly and positively realize that the stimuli are alike, if two absolutely like papers are presented, the one to a bare and the other to a gloved or covered hand. We are better able to establish the similarity of two such papers thus when both hands are bare or both similarly covered.

The degrees of hardness and softness of pencils can be readily determined by using them in the ordinary manner, and the 14 papers can be correctly arranged as to smoothness and roughness by exploring them with the point of a pencil or rod. The object-reference, however, is totally lost here. These discriminations are made in terms of vibrations which are occasioned in moving the pencil over the uneven surfaces of the stimuli and are transmitted over the pencil to the fingers and hand where sensations of vibration are set up and spread diffusely over the hand. If the pencil is covered by a material such as felt or cloth or the fingers by a soft liquid glue (*Syndetikon*), either of which absorb the vibrations which are set up at the pencil point, differences in roughness and smoothness can no longer be perceived. Sensations of vibration are chiefly responsible for the fair discrimination which is possible by touching the papers with the end of a 12 cm. rod held tightly between the teeth.

A fineness of detail, *e.g.*, the hairlike projections of blotting paper, which absolutely escapes the fingers, can be perceived by the lips, if the papers are rolled into small tubes and rubbed back and forth over them. The papers can be discriminated almost as accurately when touched actively by the great toe as by the finger tips. Most of these stimuli are quite unlike the surfaces of objects with which the toe normally comes into contact; hence the ability to discriminate does not depend upon previous experience of the particular touch organ. Memory images of impressions familiar to the fingers must be transferred to the toe to mediate such efficiency of discrimination of distinctly new qualities of touch.

If the fingers are fatigued by rubbing them back and forth over an object for two minutes or are cooled by holding them in snow until they are cold and mediate pain, discrimination is impaired so that only the more extreme papers can be discriminated. There is a marked tendency for all papers to appear smoother under these conditions, owing, Katz thinks, to the reduced sensitivity to sensations of vibration.

The "specifications" or information clues as regards the object-materials were investigated by presenting a number of different kinds of objects—linen, sandpaper, velvet, corduroy, sheet iron, sheet aluminum, leather, calico, plush, cheviot, oak wood, fir wood, tinfoil, cotton, flannel, silk—for identification by touch. These judgments are not as a general rule immediate, like those of touch modifications, but are apt to be delayed and mediated by intervening imaginal processes. This is indicated by the fact that the percentage of correct judgments increases very much when the stimuli are visually exposed to *O* just before the observational sitting. Judgments to certain objects are prompter than to others, and exploration by five fingers yields prompter judgment than exploration by one finger. Certainty of recognition of the object-material is not necessarily conditioned upon frequency of previous experience with the object, since certain of the more novel objects are identified with great assurance. Such objects make very distinctive (*eindringlich*) impressions in terms of which they are recognized without repeated presentation. Visual images play an important rôle in the delayed recognitions; Katz is undecided whether they function in judgments immediately given. Object apprehension is poor at low intensities of stimulation. Fur, glass, and metal are best recognized at low intensities, the first named by its characteristic light tickle and the last two by their smoothness. The thermal qualities, which are important aids to the recognition of certain materials, are not aroused at low intensities of stimulation. Differences in hardness and softness also disappear here.

The discriminative capacity of the stumps of 19 *O*s with lower arm and 16 with upper arm amputations was compared with that of their sound hands. Practically all of the objects were identified by the hand and more than half of them were correctly recognized by the stump. The stump shows decided improvement with practice, so that it is normally not used for the maximal discrimination of which it is capable.

Sensitivity to thickness (*Dickempfindlichkeit*) was tested by a

series of 30 papers varying from a thinness of .027 mm. at one extreme to .302 mm. at the other. *O* was allowed to explore these by the use of one or two fingers, opposing the thumb, and was permitted to choose his own rate of movement. It was discovered that all *O*s exert heavier pressure and move faster in the distal direction, and that the judgments are rendered solely in terms of the sensations aroused in moving in this direction. The return or bodyward movement is sensorily blank. The thinnest papers, .027-.048 mm., are judged in terms of the degree of veiling which the opposed digits perceive in moving back and forth. With the papers of medium thickness, judgment is rendered in terms of the degree of pliability (*Durchbiegungsfähigkeit*); with the thickest papers, the apparent amount of separation of the opposed digits is the criterion of judgment. Touch is more acute than vision with the thinner, but less with the thicker papers.

The bodyward movement—instead of the distal movement as in the case of discrimination of thickness—is psychologically richer in making discriminations of surface modifications. The distal movement is hardly noted here and is only preliminary to the more important bodyward movement. The distal movement is about twice as fast as the bodyward with some *O*s; with others the rate of movement is about the same in both directions.

Certain materials characteristically mediate one or the other of the thermal qualities, which in certain instances greatly facilitate the recognition of those materials. Metal, glass and oilcloth are characteristically cool, while wool is warm. Wool gives a positive warmth even when cooled to 18°. The thermal quality of any material becomes clearer according as its surface is made smoother. Stimulation by a large surface also clarifies the thermal quality of objects. Judgments as to object-material are given more promptly and with greater certainty, and the thermal qualities are more positive when the stimuli are presented to the lips instead of the fingers. Thermal quality is indispensable to the recognition of certain objects, while to others it gives merely an accessory coloring. Cold is more helpful to the recognition of metals and glass than warm is to the recognition of wool. Katz thinks that relatively fewer objects are characterized by cold than by warmth, and that memory has seized upon that datum for distinguishing those several objects. The characteristically warm objects are much more numerous; consequently memory would be overtaxed to distinguish those objects by warmth alone, and must depend upon other criteria for the discrimination of these materials.

The treatment of the sense of vibration is perhaps the most distinctive feature of the book. It is asserted that sensations of vibration constitute the medium through which the deaf-mute learns to converse. The remarkable skill with which Willéta Huggins detects vibrations tactually, and the manner in which Helen Keller appreciates music by placing her hand on the playing instrument, are noted. Katz also describes briefly the case of Eugene Sutermeister—whom he and Révész have been studying and concerning whom they will presently publish jointly—who contracted meningitis at three years of age, subsequently lost his hearing and the ability to speak, but at the age of fifty-five suddenly made the discovery that he can enjoy music through the medium of touch vibrations, and is now a genuine musical enthusiast. He can readily distinguish between heavy and light, or simple and complex music. He does not secure the vibrations as Helen Keller does through the hands, feet and head. He characterizes as horrible (*schauderhaft*), like the scratching of a nail upon a slate, the experience which the finger mediates when placed upon a vibrating string. He asserts that rhythm plays a very prominent rôle and localizes the sensations of vibration principally in the chest walls, which seem to vibrate like a hollow metal vessel (*hohles Metallgefäß*) stimulated in a rhythmical manner.

The vibration sense is designated by some writers an independent form of sensibility. Others identify it as a form of stimulation of deep sensibility, or as a peculiar form of stimulation of cutaneous pressure (von Frey). As early as 1846 Weber designated these experiences intermediates between touch and hearing. In the experiments with rough papers previously described, several Os reported that all forms of auditory stimulation were not excluded by stopping the ears. Katz expresses the opinion that touch embodies two distinctive stages of genetic development. The older, which belongs to the primordial organ of sense, is *contact*; the later, *vibration*, represents the first step of the organism toward the reception of distance, since vibrations can be transmitted over limited distances; it is the genetic antecedent of the sense of hearing, and shows a development in the direction of this new sense. This explains why certain simple organisms which lack auditory organs are nevertheless sensitive to the stimulation of vibrating bodies.

Katz regards the separation of the vibration sense as an independent aspect of touch as justifiable on the basis of the following facts: If the elbow rests on a stand which supports a large vibrating tuning-fork, sensations of vibration are aroused in the hand where

there is no specific pressure stimulation. The latent time of the vibration sense is much longer than that of pressure proper. Light stimulation of 5 gr. gives qualitatively different pressure sensations from heavy stimulation of 5,000 gr., but no essential qualitative difference in sensations of vibration. Excessive rubbing of the skin heightens the limen of pressure but reduces sensitivity to vibration in a much smaller degree. The vibration sense, in respect to a temporally changing nature, is more like tone than like pressure, which is temporally static. Adaptation to pressure is prompter than adaptation to vibration. The tip of the tongue, which is exceedingly sensitive to pressure, perceives vibrations very poorly.

The different parts of the body mediate different kinds of vibration sensations; some parts give delicate, others soft or coarse vibrations. Katz leaves undetermined the basis of these qualitatively different varieties of vibration sensations.

The claim for a sense of vibration depends ultimately upon the isolation of a specific sense organ. Von Frey believes that the pressure organs mediate several different qualities of sensation, but this (Katz declares) conflicts with the law of specific nerve energies. Katz thinks that the wealth of nervous elements in the skin is adequate to provide a specific receptor for vibrations, though proof is not yet forthcoming. Even other generally accepted cutaneous qualities, he says, are attributed to certain organs chiefly on the basis of supposition.

As previously indicated, sensations of vibration are the chief criteria employed in the discrimination of degrees of roughness. The vibration sensations become weaker as the explored surfaces become smoother, but Katz is unable to decide whether a perfectly smooth surface gives an experience which is totally devoid of vibration sensations. In most experiences of roughness other criteria of touch are bound up with the sensations of vibration, but in those which are perceived by a finger covered with collodion or leucoplast, or in which the rough surface is explored with a pencil held in the hand or between the teeth, the judgment of roughness is mediated solely by sensations of vibration. Movement is essential to sensations of vibration as well as to roughness, but the former are not aroused by loose or movable particles, such as sand and meal.

The vibration sense may also mediate information as to the material of the stimulus-object. When we tap a plate in daily life to ascertain the material of which it is made, we may make this determination chiefly on the basis of the sound; but it is possible to rule

out the auditory sensations and to determine the fact by sensations of vibration alone.

Contrary to the observation of Goldstein and Gelb that visualization plays a prominent rôle in coloring touch experiences, Katz allows only a very subordinate place to visual processes. He shows apparent mistrust of the method of introspection in asserting that this matter cannot be settled by using visually capable Os only. He had at his disposal two brothers, blind from birth and of normal intelligence but of little psychological training, who were able to discriminate the degrees of roughness and smoothness with only slightly less certainty than the trained, visually efficient Os. Kinaesthetic processes are indicated—and here Katz is forced to trust the introspective accounts alone—as remaining in the conscious background and as having a rather insignificant part in the experiences here related.

Although the author makes no claim to fullness of historical treatment, the book may be criticised on the ground of rather flagrant omissions of references. There is no reference, for example, to the several recent studies of Hoisington on lifted rods, even when the matter of eccentric projection is under discussion, or to the first experiment in perceptive synthesis of touch made by Bentley. The reviewer is of the opinion, too, that the author has allowed his previous interest in vision to prompt a too ready comparison with phenomena in the field of vision. The book would make just as distinctive a contribution to the psychology of touch, and would be improved as regards unity of content, if the very copious and insistent and at times unnecessary visual flavoring were omitted. But with all defects of this sort, the book brings together an enormous wealth of experimental detail and is pregnant with suggestions for further work upon a large number of tactual perceptions. It will stimulate experimental psychologists to rework the field of touch from the phenomenological point of view, and will thus serve as groundwork and point of departure for numerous studies of detail.

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KOEHLER, WOLFGANG. *The Mentality of Apes*. (Trans. by Ella Winter.) N. Y.: Harcourt, Brace, 1925. Pp. 342.

The book differs strikingly from most American contributions to animal psychology. Although it is for the most part a report of experimental observation, it does not contain exact measurements.

Elapsed time is reported in such terms as "immediately," "after a short interval," "two or three minutes later"; distances are described in the same fashion. It is quite obvious that the points which the author seeks to establish are related but remotely to exact measurement of temporal and spatial relations. Neither do we find elaborate (or simple) tables exhibiting the numerical incidence of errors; there are no learning curves. In fine, statistical presentation and statistical modes of thought are conspicuous by their absence. Instead we find the experimental setting and procedure and the experimental observations and results described in nonquantitative terms which, not infrequently, will appear "subjective" to the unsympathetic critic. On the other hand, again unlike the typical American contribution, the facts reported enable the reader to gain insight into and understanding of the nature of the animals with which the experiments deal. During four years of what may fairly be called companionship with these animals, the author has familiarized himself with the details of their everyday behavior. As a result, nine chimpanzees appeared to him as nine different and distinct individuals or, to use his own phrase, as personalities, and this orientation is apparent throughout the book.

The chief problem with which the book deals is whether the chimpanzee behaves, at least sometimes, with intelligence and insight under conditions which require such behavior. The author does not believe it to be profitable to attempt a careful definition of intelligence; "clear definitions have no place at the beginning of experimental sciences." But by way of rough orientation he remarks that "intelligence tends to be called into play when circumstances block a method of reaching a desired end which seems obvious, leaving open a roundabout method which the human being or animal takes, so meeting the situation." However, inasmuch as such a solution may occur without insight through the agency of chance, the manner in which the solution is arrived at must be taken into account. "There is in general a rough difference in form between genuine achievement and the imitations of accident." The genuine solution is a smooth continuous performance; it is executed as an unit. Often it arises suddenly; *e.g.*, the animal has been working at an unsuccessful method—it stops, hesitates, and is off on the correct solution. At such a moment, the author would say (and the reviewer also) the roundabout path is *perceived* as a way of reaching the object. Auxiliary types of observation which often help to distinguish "genuine" solutions from "chance" solutions occur throughout the book and

depend upon analogy with human behavior. Thus when the animal has exhausted his known repertory and is still unsuccessful in his efforts to secure food, he may cease all overt effort, scratch his head, and resurvey the situation (movements of the head and eyes). During this survey his glance comes to rest for some time upon some object which shortly after is utilized as a tool. At other times the author supplements his evidence with "total unanalyzed impressions." For example: "The animal grabs at objects behind the bars and cannot reach them with his arm; he thereupon walks about *searchingly*, finally turns to a shoescraper, made of iron bars in a wooden frame, and manipulates it until he has pulled out one of the iron bars; with this he runs immediately to his real objective, at a distance of about ten meters, and draws it toward him." In turning away from his real objective and beginning to walk about *searchingly*, "The animal by no means strides away from the objective in the free, careless way which we are used to in him and the other animals at times when they are seeking nothing, but goes away like some one who has a task before him. And here again I wish to warn against anyone speaking of "anthropomorphism," of "reading into" the animals, etc., where there is not the least ground for such reproaches."

In view of the very great looseness with which "anthropomorphism" is used as a term of reproach, the reviewer wishes to supplement the remarks of the author. Anthropomorphism means the ascription of human characteristics to nonhuman objects. The statement that the ape has hands is an anthropomorphism and is obviously true. The ascription of adult reasoning powers to an infant is not an anthropomorphism and is obviously false. That human characteristics can be ascribed to nonhuman objects legitimately is obviously true. Objection should be made only when the ascription is made on insufficient grounds. Now when the author bases his anthropomorphisms on unanalyzed total impressions, the reader does not have an opportunity to judge of the sufficiency of the evidence. However, the author does not base his case upon unanalyzed total impressions; these are used in supplementary fashion only.

The author stresses the fact that his experiments are so arranged that it is possible for the indirect method to become *visible* to an organism capable of seeing it, whereas, for example in Thorndike's experiments, the environmental factors on the correct grasp of which the genuine solution depends are invisible to the animal. The author

frequently makes the statement that the experiment tests the insight of the experimenter as well as that of the animal.

From the wealth of experimental observations, the following are selected. A pole is placed vertically upon the ground and, while in a condition of unstable equilibrium, the animal climbs it and attains objects as high as four meters. (This pole climbing occurred first as play and came to be utilized later.) A stick is used to scrape in objects too far away to be secured in other ways. A stick is used as a lever to pry off the cover of a can containing food. Other uses of sticks are: enlarging an opening in a wire screen in order to facilitate escape; digging edible roots; manipulating harmful or fear inspiring objects such as fire or lizards; the stick is used as a weapon in play (never when the attack is genuine). When the use of a stick is indicated in order to secure food, but a stick is not at hand, it is secured in the following ways: branches are broken off trees; boards are broken off boxes; by dint of much labor an iron bar is removed from a shoe scraper; the end of a coil of heavy wire is straightened out, making it long enough to reach the object. An ape attempts to scrape in some food with a bundle of straw which proves to be too feeble—the bundle is doubled by the animal and redoubled when necessary, and the food is attained. The animal is provided with two pieces of bamboo neither of which is long enough to secure the food. It is possible, however, to make one long stick out of the two short ones by shoving the end of one stick into the open end of the other. The animal fails to solve the problem, discontinues his efforts to secure the food, but starts to play with the pieces of bamboo. Accidentally the two pieces are united. Instantly the play is abandoned and the food secured. After this the solutions are genuine. The animal manufactures a triple stick out of three pieces. Provided with two pieces of bamboo which do not fit into each other, he sharpens one end with his teeth until a fit is secured; the procedure is: gnaw, try to fit, gnaw some more, try to fit, and as soon as the fit is secured the manufactured stick is utilized to secure food.

The animals utilize boxes, stones, other apes, and human beings as footstools to secure high objects. When one box is inadequate, they learn (with difficulty) to place boxes on top of each other and finally achieve structures of four boxes. It becomes evident that they have very little visual appreciation of static equilibrium. Mere visual contact appears to satisfy them and they depend mostly on tactual perception of (often momentary) balance. Consequently final success is largely due to chance. The animal is placed into a situation

where food would be securable with a stick, but the only stick available is hung out of reach. A box is available in another part of the room. The animal fetches the box, by means of the box secures the stick, and by means of the stick secures the food.

The above will give some idea of the scope and character of the experiments, but a mere review cannot portray the ingenious, thoughtful, painstaking care which is devoted to the description of the details of the behavior of the animals. At the same time it seems to the reviewer that the same painstaking care is not devoted to the description of the experimental setting and of the experimental procedure. Apparently the author wishes the reader to take it for granted that customary experimental precautions have been observed wherever possible. To the reviewer, the precedent seems dangerous. At the same time it seems obvious that a careful, systematic account of all conditions (past and present) which might possibly have been relevant would have been extraordinarily difficult and extraordinarily wearisome.

Although it is obvious that the book is written from the point of view of the Gestalt, the bearing which the facts reported have upon that theory is not discussed at length. As stated above, the facts are presented for the sake of the bearing which they have on the question whether the behavior of the ape is intelligent in the human sense of that word. Ostensibly the author leaves it an open question whether associationism can account for the facts reported. He urges that associationism does not necessarily deny the occurrence of insight; it accounts for it in a particular way when it occurs. On the other hand, he trains his heaviest guns against the view that "genuine" solutions can be viewed as the outcome of the occurrence of nonpurposive movements which attain a "successful" organization through the occurrence of chance successes. The arguments (not entirely novel) emphasize the very great improbability of solutions so complex, so sudden, and above all so variable in inessential details and so invariable in the repetition of essentials. These arguments would be strong if addressed to a psychologist (if there be one) who admits the efficacy of purpose in human behavior but denies it in the animal; they lose much of their force against those who deny the efficacy of all purpose. It seems to the reviewer that all attempts to weaken a mechanistic position by claiming that the mechanist "cannot explain" one or another actual occurrence are poor strategy and are based as a rule on an inadequate understanding of the mechanistic position. In the first place, the explanation of the mechanist does

not depend on chance alone, but assumes the validity of all the laws of physical science. In the second place, the mechanist assumes that the inherited structure of the organism which lends itself to the development of behavior which *appears* purposive is itself the outcome of mechanical forces supplemented by chance. In view of the great complexity of the subject and in view of the immense amount of mechanical detail which is unknown, it requires but moderate ingenuity to meet the challenge that one "*cannot explain*" some observed fact through the formulation of hypotheses. The strength of the mechanist lies in his professed inability to understand the logical force of anything but a mechanistic logic. It might be good strategy to leave him to his self-confessed stupidity; for after all the mechanist does understand. But the best strategy is touched upon in a sentence at the bottom of page 225: "To give the essentials, it is necessary to use expressions in describing all this, which themselves involve meaningful actions." Needless to say, this strategy seems best to the reviewer because he himself has attempted to exploit it more at length. I would sum it up in the tautology that the meaning of the meaningful act is omitted if the act is described in purely mechanistic terms. The mechanistic psychologist would do well to ponder this tautology. The problem of meaning still awaits his thoughtful consideration.

With reference to the problem whether or no animals have "ideas," it seems to the reviewer that the Gestalt psychologist misunderstands the problem quite as much as the opponent whom he is combating. For example, he accepts Hunter's Delayed Reaction experiment as relevant to the problem and reports observations of his own according to which chimpanzees remember after sixteen hours the location of fruit which has been buried in a homogeneous field of "at least 400 square meters." But, obviously, in order to remember there must be something to remember. In Hunter's experiment the animal must remember one box with reference to the two other boxes. A human adult, for example, would see that the attractive box is the middle box. In the author's experiments it is not clear from the description of the experimental setting just what the chimpanzees had to see in order to solve the problem, but it seems obvious that they must see and remember spatial relations of some sort. And it is not clear to the reviewer what the perceiving and "remembering" of spatial relations has to do with the presence of "ideas," unless it is assumed (erroneously) that the presence of ideas is essential to the perceiving of spatial relations. In Hunter's

experiment the animals did not see the middle box as the middle box; accordingly they could not re-see it in that way.

The conclusions of the author may be summed up as follows: "The chimpanzees manifest intelligent behavior of the general kind familiar in human beings"; "they behave in a way which counts as specifically human." In these experiments the insight of the chimpanzee is determined principally by visual apprehension of the situation. They are decidedly inferior to the human adult in visual apprehension of orderly Gestalten. For example, an orderly coil of rope (probably) is seen as a tangled mass by the anthropoid; their visual appreciation of static equilibrium is practically *nil*. Their phonetic and other gestures are purely subjective, *i.e.*, they are expressions of emotion but do not designate or describe objects. (To the reviewer it seems that some of the gestures described as characteristic of begging for food approach the designation of food.) Lack of speech and of "so-called images" are the drawbacks which prevent the ape from developing even the rudiments of a culture. The apprehension of past and future by the ape is probably extremely limited. (This is expressed by the author as "the stretch of time in which the chimpanzee lives.")

Although the author does not deny that insight arises at times as the result of past experience, he favors the view that it may arise also directly out of the situation by virtue of autochthonous possibilities in the animal. The reviewer is not as yet entirely clear about the place given to movement and activity in the Gestalt theory. He wishes to say, therefore, that the statement that it is the act which means is not contradicted by the assertion that the act is autochthonous.

An appendix deals for the most part with nonexperimental observations of the social life of these animals. They are too interesting and too varied to be condensed or summarized. Bare mention of some of the topics is all that is possible. There is strong group solidarity as shown in defense against attack and common attitude toward strangers. The group is a strong stimulus for the individual and the individual becomes listless, dejected, and refuses food when separated from the group. On the other hand, the individual is not missed by the group, but is welcomed when he returns. Sympathetic induction of emotion is of frequent occurrence. Special social relations between individual apes and between ape and man, such as friendship, indifference, enmity, and the like, are described in terms which leave no doubt that, to the author, these relations resemble human relations even though they do not approximate the latter in

complexity. In his account of the gestural and vocal repertory, the author holds that the gestures are purely subjective and never designate nor describe objects. He does not believe that this limitation is due to glossolabial limitations. In the appendix, expressions such as "sparkling eyes," friendly manners, glances of hate, and piteous and reproachful sounds, abound. The apes seek forgiveness, and they play jokes. The embrace is a "reassurance of social cohesion," "consolation in moments of terror and anxiety," and "just because like is so jolly." In many instances such terms are accompanied by "objective" details which render their use plausible and convincing to the reviewer. In other cases the author does not submit his evidence. He tells us always what he has observed (not inferred), but he does not always attempt to prove to us that he has seen correctly. It seems to the reviewer that these informal touches are valuable in helping the reader to see what the author has seen, a thing which would be impossible with a more pedantic mode of presentation. The book attempts to sketch, as a whole, a picture of the mental life of the chimpanzee. The critical reader should have no difficulty in discriminating between evidence and unanalyzed impression. He is left free to judge of the truth of the picture as a whole and of the accuracy of the details. At any rate, the author has seen more than mechanical responses to mechanical stimuli.

The book is clearly and interestingly written. A few minor blemishes in the translation annoy rather than confuse.

CURT ROSENOW

The University of Kansas

YERKES, ROBERT M. *Almost Human*. N. Y.: Century, 1925. Pp. xxi+278.

This volume gives an account of the exceedingly interesting ape colony of Madam Rosalia Abreu near Havana. Those who have been interested in apes and their psychology will welcome this description of the work that is being done in such remarkable fashion. After defining what a primate is, Yerkes describes the Abreu collection and gives Madam Abreu's observations regarding their reactions. This collection contains not only examples of the lower orders but also has a very fine collection of the higher primates, especially chimpanzees. Unfortunately the gorilla is lacking.

In a chapter on Primate Intelligence, the author gives a number of very interesting observations of Madam Abreu. Many compara-

tive observations are made concerning the differences of intelligence between the different kinds of anthropoids and, in this comparison, the chimpanzee appears to be the most intelligent. These observations of Madam Abreu's with regard to anthropoid intelligence are supplemented by a review of the observations and experiments that have been performed on these animals by psychologists. The work of Boutan, Köhler, Kohts, and Yerkes is largely quoted. The summaries of Kohts, written in Russian, are particularly interesting inasmuch as this is the first time that this material has been made available to the English reading public. Two chapters follow on anthropoid emotions. A chapter on anthropoid speech follows.

An exceedingly interesting account of several chimpanzees bred and born on Madam Abreu's estate is given. This chapter is of extreme value inasmuch as it gives practically the only information we have on the infant chimpanzee. An account of the methods for caring for, breeding, and rearing the apes will prove of great benefit to anyone who contemplates going into work with anthropoids. The description of one of Yerkes' own chimpanzees, Chim, is given. In this the author gives a vivid description of his personality and of his sickness and death. In a final chapter the author points out the social significance of studies of primates such as he has described.

The book is written in an easy, popular style which makes for easy reading. It is filled with many excellent pictures of the Abreu estate and of primates—especially of anthropoids doing various bits of behavior. A bibliography is appended.

SAMUEL W. FERNBERGER

University of Pennsylvania

DUNLAP, KNIGHT. *Social Psychology*. Baltimore: Williams and Wilkins, 1925. Pp. 261.

This book, in spite of the praise which has been given it in certain popular reviews, is one which will prove disappointing to all who hold that the social sciences should be based upon human psychology and that the mental and social sciences form a unity. The writer of this notice happens to be one who has long defended this position. If psychologists are to make real contributions to the social sciences, however, they cannot do so by carrying their generalizations from individual psychology uncritically over to the social field. They must have a critical knowledge not only of social facts and conditions, but even of social theories. As Professor Small has justly said, "The

first step in any science is finding out what has already been done in the particular field." But Professor Dunlap seems to be of another mind; for he discusses the most important problems connected with the family, the state, religion, morals, general social organization, and social progress without any indication of having attempted a critical examination of the scientific literature already existing on these problems. It may be remarked that it is just this disregard of historical background which makes American scholarship often so little respected.

Lack of space permits of only a few illustrations in substantiation of these charges. In the first place, Professor Dunlap does not clear up the ambiguity attaching to the phrase "social psychology." On page 11 he seems to define his subject as an investigation of human groupings and an analysis of the mental factors involved therein. But on page 15 he defines social psychology as "the study of whatever the stimuli from other persons have contributed to our conscious lives and to the activity which results from conscious life." He seems not to have realized the inconsistency of these two definitions, and while mainly following the first, he also enters the field indicated by the second.

Professor Dunlap would restore "the desires" to the central position which they once held in the social sciences. He does not mention the fact that all nineteenth century economics and sociology was built upon a philosophy of desire; we can scarcely assume that he was ignorant of this. Most of recent social science has discarded the attempt to interpret social behavior in terms of human desires; for the reason that it finds that the desires of individuals are very largely products of their social life. Desires are not the ultimate determinants of group behavior, but are themselves in need of explanation, partly through environment, habit, instinctive tendencies, and intelligence, and also through the culture of human groups.

But Professor Dunlap hardly recognizes the importance of culture in the anthropological sense in explaining social behavior. He seems quite unaware of the revolution which has been wrought in the social sciences through the introduction of this concept from anthropology. Instead of appealing to culture to explain social behavior and social conditions, he falls back upon a reëmphasis of the importance of the biological factor, again seemingly unaware that biological processes affect the social process even more indirectly than do mental processes. Thus in his discussion of the conditions of social progress in Chapter VI he has nothing more important to offer than a eugenics program.

Professor Dunlap is seemingly unaware of the content even of certain popular movements. Thus those who are working for the socialization of religion, to give religion a practical social value, will be surprised to learn that "religious activity has no purposes beyond the activity itself . . . social religion consists in the seeking of common stimulations, of common feelings, and of common activities, with nothing further in view. . . . Social religion is nonpractical social experience and social activity" (pp. 113, 114). Evidently Professor Dunlap is using the term "social religion" in quite a different sense from its popular use, and without so intending he seems to be giving aid and comfort to the fundamentalists.

It would be quite unfair, however, to leave the reader with the impression that there is little of value in Professor Dunlap's *Social Psychology*. He shows clearly the impossibility of employing extreme behaviorism in social psychology, because the social life consists of an exchange of conscious experiences. He rightly discards "instinct" as a sufficient explanation of social behavior. Finally, the book is characterized by a spirit of liberalism and of good sense in the discussion of the problems with which it deals; but liberalism and good sense are not a substitute for a critical knowledge of social facts, problems, and theory. They are after all but preliminaries to a true scientific attitude, which must be based upon critical knowledge. On the biological and individual psychological side Professor Dunlap shows clearly enough that he has such knowledge; but unfortunately not on the social side.

CHARLES A. ELLWOOD

University of Missouri

PRESSEY, L. C., and PRESSEY, S. L. *Methods of Handling Test Scores*. N. Y.: World Book Co., 1926. Pp. iv+60.

The purpose of the authors is to present the more simple methods of handling test scores. They eliminate any difficult mathematics and succeed in showing any individual who handles test scores or school grades how easy it is to find those measures which are significant.

The book is divided into four parts for the discussion of the tabulation of results by means of tables and graphs, finding the median, the use of norms, and ways of determining relationships between several test scores. In addition, ten lessons are divided among these chapters for the purpose of indicating how the test

results should be treated, and each lesson is followed with a practice exercise, for which answers are given in the book.

The methods are clearly presented and the book should be valuable as supplementary reading and practice in an elementary course in which the student is first presented with group scores of any nature.

H. SHERMAN OBERLY

University of Pennsylvania

LEATHERMAN, Z. E., and DOLL, E. A. *A Study of the Maladjusted College Student*. Columbus: Ohio State University, 1925. Pp. ix+56.

This monograph presents an initial report of the student personnel work which has been carried on for some years under the direction of the Psychological Clinic of the Ohio State University. It is not claimed that the problem of dealing with the maladjusted college student has been solved, but a most interesting approach to this very important field of clinical psychology is described.

The statement of the general problem is followed by brief chapters on the development of mental testing in college and university and the administrative use of test results. There ensues a detailed analysis of the causes of maladjustment, under the three rubrics, Scholastic, Social, and Personal. Actual cases of maladjustment as indicated by a study of records from the files of the Dean of Women are then analyzed with reference to the distribution by classes and by colleges, and the causes assigned by the students for their various difficulties. In the great majority of cases it is shown that the interview with the dean has been brought about through scholastic difficulties, and the great number of student problems not accompanied by academic deficiencies can only be guessed at.

Contrasted with the causes of maladjustment assigned by the students themselves, there is suggested an analysis of probable causes which may not be recognized by the student at all. These are grouped under Mental, Physical, Environmental, and Emotional Causes. A definite procedure for the clinical examination of the college student is outlined, as well as a number of type cases in which maladjustments have been corrected or greatly improved through the agency of the student clinic. A comparison of the methods employed and the results obtained is made with similar investigations carried on in other colleges. The conclusion is reached that very few if any col-

leges in this country are making any systematic and thorough effort to assist the student in the solution of his most vital problems.

The monograph concludes with a bibliography of fifty-one titles dealing with the general problems of student personnel.

KARL G. MILLER

University of Pennsylvania

DEARBORN, WALTER F., CARMICHAEL, LEONARD, LORD, ELIZABETH E. *Special Disabilities in Learning to Read and Write*. Harvard Monographs in Education, Series I, Vol. II, No. 1, June, 1925. Pp. 75.

This monograph consists of four sections: a study of a child with special disability in reading, by Miss Lord; a study of a case of mirror writing, by Mr. Carmichael; an introductory statement, and a final discussion of the etiology of "congenital word blindness," by Dr. Dearborn.

Miss Lord presents an interesting picture of a boy previously diagnosed as feeble-minded who, she finds, is but slightly below average intelligence but handicapped by a special disability in reading and spelling. A series of diagnostic tests reveal no pronounced deficiency in vision, perception, memory, etc., in general, and these results, combined with observations made during a period of remedial instruction, lead to a diagnosis of "word-blindness" which "is not a pathological condition of a visual memory center for words and letters but is due to a defect in the association fibers; to insufficient associations between the sense areas, and to lack of coördination in the motor response to visual and auditory stimuli." The author is inclined to think not that the defect is congenital—the traditional diagnosis—but acquired, inasmuch as "instruments were used at delivery and there was also a history of a severe blow on the head when the boy was about five years old." To the reviewer the evidence for this type of diagnosis is by no means convincing; it appears to him that the possibilities of explaining the trouble by means of inappropriate habits of learning acquired in the first stages of reading should have been pursued more vigorously. The results of the remedial treatment suggest the same view. Miss Lord tried, one after another, several types of training until at length a type of teaching combining phonetic study and context reading began to yield returns, with the result that after several years—during which the boy's work was not observed by the investigator—fairly facile

reading ability for easy material, at least, was reached. Were the difficulty due to a general "deficiency in association fibers" it is not clear that one method of learning should be highly productive while others should be unproductive. The results, to the reviewer, suggest the importance of securing a method which will overcome the subtle inhibitive factors that have blocked the path of development. Miss Lord, however, takes the view that "pedagogical methods are secondary to . . . interest . . . and desire to learn."

Mr. Carmichael's brief study of a case of mirror writing leads to a very interesting and, to the reviewer's mind, a plausible theory. It is suggested that mirror writing is due not to some inherited neural twist, as many have held, nor to some neural distortion produced by enforcing right-hand writing on a left-handed child, as Judd has argued, but to a process of learning quite normal for a left-handed child during the initial "scribble" stage of writing. It is held that the left-handed child will find it easier to proceed in writing from a point near the center of the body toward the left mainly because by progressing in this direction—unlike the right-handed child—a view of the written material is not covered by the hand. This procedure does not harmonize with the demands of the teacher and the learner's observations of the right hands of others during writing. "In other words," to quote from Dr. Dearborn's comment on the study, "there is a conflict instead of integration (as in the right-handed) of kinaesthetic and visual stimuli and imagery such as is artificially produced in the mirror tracing test." Often "the left hander 'sticks' to his earlier feelings and memories of movement," which may result in mirror writing. Dr. Dearborn also points out that the left hander's tendency to observe things, such as words, from right to left may be responsible for difficulties in learning to read. These are ingenious observations and suggestions; we shall await with interest further data that are promised by Dearborn.

The last paper in the monograph is an able, critical review by Dearborn of twenty earlier publications dealing with the diagnosis of difficulties or "disabilities" in reading. Dearborn discussed the theories concerned with the fundamental causes of such disabilities and presents his own views. So varied are the theories and, as a consequence, so numerous the lines of criticism which are offered that the reviewer feels unable to do them justice in a summary account. The types of criticisms offered are suggested by the nature of Dearborn's own views, which he has summarized as follows: "If there are specific defects in the centers or areas of the brain in which there

is said normally to be deposited the visual memories of letters and words, these conditions will account for but a small proportion of the cases. Auditory difficulties, both central and peripheral, must also be recognized, as well as muscular or kinesthetic deficiencies and peculiarities. Secondly, there are cases which would appear to develop on a basis of pure habit, especially with a supporting background of neurotic or psychopathic behavior, but perhaps more commonly these factors merely complicate or are in part the result of the first named deficiencies. Finally, some of the factors which are ultimately responsible for the condition of word blindness, or for the inhibiting habits which result in this condition, would appear to be inheritable."

Since these views are based in part at least on studies of a group of poor readers which Dr. Dearborn has not yet published, those interested in this fascinating field of research will await with eagerness the further reports that are promised.

ARTHUR I. GATES

Teachers College, Columbia University

BOOK, W. F. *The Psychology of Skill with Special Reference to Its Acquisition in Typewriting*. N. Y.: Gregg, 1925. Pp. viii+257.

BOOK, W. F. *Learning to Typewrite with a Discussion of the Psychology and Pedagogy of Skill*. N. Y.: Gregg, 1925. Pp. xvii+463.

These two books bear witness to the sustained interest of their author in a problem begun by him as a student and studied more or less systematically down to the present year. The author began an investigation of the acquisition of skill and chose typewriting as the type of skill to be studied. The results of this work were reported in Volume I of the *Studies in Psychology*, University of Montana, December, 1908. The demand for this report has been great and, as it has been long out of print, it is now republished in its original form under the title, "The Psychology of Skill." Although this work has been well known to psychologists in general, it is fortunate that it will now become more readily accessible to all. It is a careful study of the way in which three observers gradually acquired a considerable skill in a complicated psychomotor activity. Careful analysis of the responses was made by means of drum records of different observers at different stages of practice. In addition to these objec-

tive measures, copious introspective reports were obtained. From both of these sources a detailed explanation of the various stages in the acquisition of a skill is made. The different orders of habit and their dependence on one another is described. The author distinguishes between inferior and superior orders of habit, and states that our difficulty in forming superior habits is because we have had no previous practice in other kinds of learning. This seems a doubtful explanation to the reviewer. It assumes an immense amount of transfer. Furthermore, it may be that many individuals have arrived at superior order habits in some simple act of skill.

Of particular significance in this account of learning is what the author calls the critical stage. These are the places where improvement ceases or actual relapse occurs. The importance of the teacher as a help to the learner at these critical stages is repeatedly emphasized. This would seem to be the *raison d'être* of the second book under review. For in this book the author turns to practical use his work in typewriting in order to help both the learner and teacher of that subject. It is, however, much more than this. In Part I we have a general discussion of the psychology of skill which actually treats of the important topics in the psychology of any kind of learning. Particular attention is given to the laws of learning, in which respect the author follows Thorndike very closely. Indeed, this first part of the book is an abbreviated educational psychology, and it could be profitably read by any student of educational psychology. Part II is a detailed analysis of learning to typewrite. Particularly interesting here is the analysis of the work of the expert typists. Part III is an attempt to point out to the teacher of typewriting how he can most effectively function. In this connection the place and value of objective tests is stressed. If the tests mentioned by the author cover the field completely, then the reader will be surprised at the very small amount of work that seems to have been done. There seem to be very few achievement tests and no mention is made of standards or norms.

These two books represent a very careful and complete study of one particular type of learning. Similar detailed studies of other kinds of learning would be welcomed. The books will not only be useful for teachers and students of typewriting, but they should prove instructive to any student of educational psychology.

R. PINTNER

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